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PRESIDING: Dr. Edwin T. Wyman, Boston, Chairman.

CHAIRMAN WYMAN: I first wish to thank you all for making me your Chairman this year. I appreciate the honor more than I can tell you.

The first paper on the program this morning is "Erythroblastosis of the New-Born; Diagnosis and Treatment," by Dr. Stewart H. Clifford, of Boston, and Dr. Arthur T. Hertig, pathologist of the Boston Lying-In Hospital.

Dr. Stewart H. Clifford, Boston.

ERYTHROBLASTOSIS OF THE NEW-BORN*

BY STEWART H. CLIFFORD, M.D.,† AND ARTHUR T. HERTIG, M.D.†

INTRODUCTION

THE clinical syndromes described as congenital hydrops fetalis and icterus gravis have been known for a long time and have constituted a mysterious and highly fatal group of diseases afflicting the new-born infant. It has been only in recent years that careful histopathological studies have demonstrated that both conditions may be but clinical varieties of the same underlying "erythroblastic" process[1 to 6]. This pathological picture consists of a continuation of or a reversion to the embryonic level of blood formation with large numbers of nucleated red cells in the circulating blood and active hematopoiesis in the liver, spleen, pancreas, kidneys, adrenals, thymus, pituitary and lymph-nodes as well as in the bone-marrow.

The condition has been too recently recognized and the total number of patients intensively studied too few, to allow a comprehensive discussion of the subject at this time. Our purpose in this communication is to stimulate general interest in the early recognition and thorough investigation of these patients as they are encountered in the future. To this end we wish to make available what practical information we have been able to glean from the literature and from our personal study of seven cases of erythroblastosis of the new-born (two of the congenital hydrops type and five of the icterus gravis variety) seen at the Boston Lying-In Hospital during the past nine months. Five of the seven patients died and showed the pathological picture of erythroblastosis. During this same period we encountered six other cases simulating erythroblastosis but not falling into the clinical types mentioned, the interpretation of which must await further experience. These latter cases are beyond the scope of this paper as we wish to confine ourselves to the well-recognized types of the disease and emphasize the means by which it is possible to make a presumptive diagnosis within a few minutes from the time the child is born and to present our present conception as to treatment.

HISTORICAL

Cases of congenital hydrops were reported in the seventeenth and eighteenth centuries[1] and Ballantyne[7], in 1892, collected about sixty cases from the literature. Reports of a condition which was in all probability icterus gravis were to be found in the literature in 1873[8]. Since this time many references to this syndrome are to be found but until recently they were little more than clinical reports. Note was made of the increased nucleated red cells present in the blood in icterus gravis in 1909[10]. In 1925 this was again noted[9] and five years later[5] a very complete report of two cases was published which recorded the anemia and total nucleated cell counts of 474,000 and 150,000 of which 45 and 90% respectively were nucleated red cells. The anemia of icterus gravis has been known since Süsstrunk's report[11] in 1924. A few articles have appeared in which the correlation between congenital hydrops and icterus gravis has been suggested[4].

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The possible relationship between the congenital anemias of the new-born and erythroblastosis can only be mentioned in passing and left as an open question.

INCIDENCE

The incidence of congenital hydrops is of rare occurrence and has been reported as 1 in 2000 and 1 in 3000 births[12]. Our incidence rate was 1 in 1200 births.

Icterus gravis has also been considered as of rare occurrence but actual figures are not available. Recent publications give the impression that it is more frequently encountered than was supposed. One writer[13] collected 130 cases while another[14] encountered 108 instances of the disease with 18 of these occurring in four years. Hampson[14] has estimated from the returns for England and Wales for a seven-year period that 1800 infants died as the result of what was in all probability icterus gravis. On the basis of our experience at the Boston Lying-In Hospital erythroblastosis is far from a rare disease, in as much as we have seen seven proved cases in the past nine months. In this period of time 2400 babies have been born, resulting in an incidence rate of 1 in 340. As our knowledge of the disease increases the incidence will probably become greater. If erythroblastosis is found to evidence itself in other than the two forms here considered, it is likely to become one of the most common disorders of the new-born period.

THE DISEASE PROCESS

The etiology of erythroblastosis is unknown but certain facts that are now well established enable us to attempt a tentative reconstruction of the disease process. Congenital erythroblastosis may have a familial incidence and a subsequent pregnancy may produce a different clinical type of the disease[15]. It therefore seems likely that the disease results as a defect of the primitive germ-plasm or fertilized egg. Erythroblastosis runs the major portion of its course in utero and in the first days of life. It may occur in either sex, it has no racial predilection and the first born is usually spared. Its occurrence is not related to tuberculosis, toxemia or anemia in the mother.

An unknown stimulus manifests itself in late uterine life as a pathological prolongation of or a reversal to the embryonic system of blood formation. As a result abnormally young forms appear in the circulating blood. Concomitant with this abnormal production there is an increased destruction of the red blood cells. Congenital hydrops represents a more chronic process with widespread erythropoiesis of early embryonic type showing numerous erythroblasts and lesser numbers of normoblasts, myeloblasts and myelocytes. Icterus gravis demonstrates as widespread erythropoiesis but the cells tend to be more mature, the peripheral vessels containing many normo- and megaloblasts with relatively fewer early erythroblasts. In this latter type there is evidence of more acute red blood cell destruction.

PATHOLOGY

The morbid anatomy responsible for the manifestations of erythroblastosis present in these hitherto regarded dissimilar clinical conditions is best described as a persistence of or reversal to the fetal type of blood formation. The variations encountered are quantitative as well as qualitative in nature. There are in general two main groups: those cases presenting universal edema as their most prominent feature, and those with varying degrees of jaundice. Occasional ones show neither edema nor jaundice. The former gives evidence of a somewhat more chronic process while in the latter it tends to be more acute.

The patients with congenital hydrops are markedly edematous and large effusions into one or all of the serous cavities may be found. A marked anemia is often present as evidenced by the waxy pallor of the skin and the watery consistency of the blood. Associated with these findings there is frequently an enlarged heart, which may weigh two or two and a half times normal. The spleen is firm and enlarged, often six to eight times, with more or less loss of the usual markings. The liver is also enlarged, up to two and half times, frequently losing its typical architecture and showing intense diffuse bile staining after formalin fixation. The extrahepatic bile ducts are not unusual. The placenta is often pale, firm, and enlarged, often two to three times.

Microscopically the outstanding feature is a marked erythropoiesis, often of very early embryonic type occurring throughout the stroma of most organs including the spleen, liver, pancreas, adrenals, kidneys, prostate, thymus, pituitary and the placenta. Numerous basophilic and polychromatophilic erythroblasts, in addition to lesser numbers of normoblasts, myeloblasts and myelocytes are found in all vessels. Throughout the liver numerous foci of early erythroblasts with varying numbers of normoblastic foci are seen, often compressing and distorting the hepatic cords. Leucopoiesis, predominatingly of eosinophilic type, is seen in the portal spaces and to a lesser extent throughout the stroma. A varying amount of iron-containing pigment is present in the Kupffer and liver cells in addition to the phagocytes of the spleen. There is also more or less inspissated bile appearing as casts in the bile capillaries. The lymphoid tissue of the spleen is often decreased, while all follicles may be completely obliterated. The pulp contains many early and late erythropoietic foci in addition to developing white cells.

The bone marrow shows active red and white cell formation. The placental villi are enlarged, edematous and somewhat hyperplastic, encroaching upon the intervillous spaces. Numerous erythroblasts and normoblasts in addition to erythropoietic foci are seen within the fetal vessels.

The group of patients presenting varying degrees of jaundice and more or less anemia as their prominent features show little if any edema, although slight serous effusions may occur. Generalized icterus is usually marked, although this may be absent. The heart is usually slightly enlarged. The liver and spleen, as in the first group, are enlarged, often to the same or even greater extent. The extrahepatic bile ducts are normal. The brain is frequently icteric with intense pigmentation of the nuclear structures, a condition described in the literature as "Kernicterus." The placenta may be normal in appearance or slightly enlarged up to one and a half times although it is neither pale nor firm. Bile staining of the membranes is sometimes observed.

Microscopically, erythropoiesis is widespread as in the first group, but may be of a less severe degree and more mature type. Peripheral vessels contain many normoblasts and megaloblasts with relatively fewer early erythroblasts. Pigmentation of phagocytes in the spleen is often marked, which may be correlated with the sudden, intense and frequently increasing jaundice seen in these patients. Pigment casts are often seen in the bile capillaries and may be very prominent. Hematopoiesis, as in the cases of congenital hydrops, is more prominent throughout the liver and spleen. The bone marrow shows active hematopoiesis as well. The brain, interestingly enough, is free from iron or other pigment when ordinary paraffin sections are studied. The placenta shows slight edema, hyperplasia and nucleated red cells in the vessels, but no erythropoiesis.

Tissues from organs uniformly show no spirochetes of syphilis when stained by Levaditi's method. Blood cultures are usually negative, except in the occasional case complicated by terminal bronchopneumonia or other infection, so that demonstrable infection plays no part in the pure case of erythroblastosis in any of its manifestations.

CLINICAL TYPES OF ERYTHROBLASTOSIS

I. *Congenital Hydrops Associated with Erythroblastosis*

At birth the presenting picture is one of severe anemia, the skin at times being waxy-white and covered with a thick yellow colored vernix caseosa. A varying degree of dropsy is present from generalized anasarca to edema of the extremities. Respiration is initiated with great difficulty, if at all, and during the brief period that life remains is characterized by great irregularity and gasping inspirations. Cyanosis cannot develop because of the anemia that is present. Jaundice is either absent entirely or present to a very slight degree. The liver and spleen are greatly hypertrophied and there is a resultant enlargement of the abdomen. In our experience the heart has been hypertrophied to twice its normal size but we do not know that this will prove to be a constant finding in future patients. There may be a loud hemic murmur heard over the precordium. The umbilical cord may be edematous while the placenta may be over twice its normal size and show edema and pallor. The red blood cell count may be reduced to below 500,000. The total nucleated cell count is variable and has been recorded between 5,000 and 297,000 of which the majority are nucleated red cells. The nucleated red cells in the cases exhibiting the high total nucleated counts may constitute 90% of the acetic acid resistant cells.

II. *Icterus Gravis Associated with Erythroblastosis*

At birth the infants of this group may appear normal to superficial inspection but in our experience *they have all been covered with a thick golden-yellow vernix caseosa.* We wish to emphasize the extreme importance of watching for this peculiar colored vernix for it has been the one sign that has enabled us to suspect the presence of erythroblastosis at the instant of birth. The placenta may be considerably hypertrophied and show on subsequent microscopic examination nucleated red cells in the vessels. Slight icterus is frequently detected at birth while physical examination will reveal an enlarged liver and spleen. Cardiac hypertrophy may be present. (It was present in all three of our fatal cases and in the two reported by Ferguson in which the cardiac findings were mentioned. It was not detected in our two cases that survived.)

A blood smear will show the characteristic increase in the numbers of nucleated red cells. A tendency to bleed is present in about half of the cases and the upper trunk and head may be covered with petechial hemorrhages while subcutaneous ecchymoses may develop shortly after birth. More extensive evidence of hemorrhage may develop within a few days.

The jaundice rapidly increases until by the end of the second day it is intense. There is extreme respiratory distress developing on the second or third day of life with labored, grunting respirations, dilatation of the alae nasi, retraction of the costal margin and use of all the accessory muscles. By this time the patient develops intermittent spells of cyanosis that soon become continuous. The clinical picture suggests either a severe pneumonic process or an intracranial hemorrhage but the x-ray and physical examination show no consolidation

while lumbar and subdural punctures exclude the presence of a gross hemorrhage. Evidence of more extensive bleeding may now develop with the oozing of blood from the mouth, hematemesis, hematuria or hemorrhage into any of the body cavities. At any time, usually from the second to the fifth day, the infant may suddenly pass into profound shock and die.

A moderate anemia usually accompanies this condition but it is masked by the jaundice and cyanosis. The red cell count may be between two and four millions. The total nucleated cell count is increased and may pass 100,000. The number of nucleated red cells is increased in direct proportion to the height of the total nucleated cell count.

DIAGNOSIS

The attending obstetrician is in the strategic position to make the early diagnosis of erythroblastosis in the new-born. The mother's past history may lead to the presumption that erythroblastosis had occurred in a previous offspring. The presence of this disease should be suspected at delivery if the infant is anemic, edematous, jaundiced or covered with a peculiar golden-yellow vernix caseosa. The discovery that the placenta is abnormally large is further suggestive. At the initial examination of the erythroblastic baby dusky cyanosis, petechial hemorrhages or ecchymoses may be noted. The abdomen may be prominent due to the presence of free fluid and to enlargement of the liver and spleen. Cardiac hypertrophy with or without a murmur may be found. An early blood examination adds important confirmatory evidence when the total nucleated count is found to be increased above the normal limits and when the differential count demonstrates an abnormal number of nucleated red cells.

We are dependent upon Lippman's[16] careful blood studies on 71 new-born infants for our standard as to what the normal counts are at this period. The total nucleated count ("white blood cell count") is considered abnormal when it is greater than 20-25,000 at birth. There should not be more than five nucleated red cells seen in counting one hundred nucleated cells at birth (5%). By the second day the nucleated red cells should have dropped to below 1%. In determining whether the nucleated red cell percentage is abnormal, it is therefore more important to find an increased number on successive daily examinations than to rely on one determination. The average red blood cell count at birth is from 5,200,000 to 5,600,000 while at one week of age the average is between 5,000,000 and 4,000,000.

The presence of an abnormally high number of nucleated red cells alone is not pathognomonic of erythroblastosis of the new-born. We do not know at the present time how many other conditions may be accompanied by an increased liberation of young forms into the circulating blood. We have observed this finding in what has been considered congenital heart disease. It has been observed at the Children's Hospital in a new-born infant that at autopsy proved to have congenital syphilis without evidence of erythroblastosis. It remains for future studies to explain the significance of a simple increase in the numbers of circulating nucleated red blood cells.

While the presence of abnormally colored vernix caseosa and hypertrophy of the placenta has in the majority of instances led us to suspect correctly the presence of erythroblastosis they have also been seen associated with other conditions. For instance they have been present together or singly in cases with enlarged hearts and increased nucleated red cell counts but without erythroblastosis at postmortem examination. The golden vernix has been seen on a few apparently normal babies. The true significance of these findings must also await further studies.

DIFFERENTIAL DIAGNOSIS

There are a number of conditions that may be confused clinically with erythroblastosis of the new-born. It is highly probable that in the past erythroblastosis may have been diagnosed as one of these diseases. It is impossible at this stage to give an accurate clinical differential diagnosis because, as already mentioned, we do not know what the blood findings, the type of vernix and the placental size will prove to be in these other conditions when once they are investigated. The positive diagnosis of erythroblastosis can be made at the present time only after pathological examination of the tissues.

Icterus Neonatorum. In icterus neonatorum the jaundice is less intense and does not appear before 12-24 hours. It is unassociated with edema, anemia, cyanosis, bleeding, cardiac hypertrophy, dyspnea, or marked enlargement of the spleen and liver. It does not result in a seriously ill patient and does not cause death. The literature and our own experience in a few patients so examined would indicate that it is not accompanied by the blood findings seen in erythroblastosis.

Congenital Obliteration of the Bile Ducts. The jaundice associated with congenital obliteration of the bile ducts may be present at birth but usually does not reach marked intensity before the second or third weeks of life. There is no edema, cyanosis, dyspnea, cardiac hypertrophy, or gross splenic enlargement. There is enlargement of the liver and there may be bleeding. The stools are usually clay colored but, due to the secretion of bile in the lower bowel, bile may be found uniformly mixed throughout a loose stool or may form a bile-

stained shell around a typically clay colored stool core. We do not know what the blood findings, the type of vernix caseosa and the size of the placenta will prove to be in this disease. The diagnosis of obliterated bile ducts will of course become obvious as the course of the condition is followed.

Jaundice Associated with Sepsis. Undoubtedly many cases of erythroblastosis have in the past been diagnosed as sepsis of the new-born. The symptoms attributed to sepsis may exactly simulate those seen in icterus gravis. The differential diagnosis between these conditions is unsatisfactory at this time without a postmortem examination. Clinically the jaundice of sepsis should appear later than that of erythroblastosis. The presence or absence of fever is of no differential value, for marked sepsis may occur at this age with or without fever, while we have seen proved cases of erythroblastosis associated with bleeding have a high fever for several days. The presence of a positive blood culture shortly before death does not prove the case to be one of primary sepsis for it may be the result of a terminal infection in erythroblastosis. Both conditions have enlarged livers and spleens. As yet the blood has been studied in too few cases of jaundice associated with sepsis in which erythroblastosis has been excluded by pathological studies to know the differential value of an increased nucleated red cell count.

It is obvious that much work remains to be done before the group of cases exhibiting jaundice as the result of sepsis is sharply enough defined to enable an accurate clinical differential diagnosis.

Winckel's Disease. Winckel's disease is similar to the type of erythroblastosis with jaundice and cyanosis except that hemoglobinuria is present. Here also our knowledge is too scanty to go further in making a differential diagnosis.

Congenital Syphilis. Congenital syphilis must be excluded in every patient suspected of having erythroblastosis associated with icterus gravis. The case already referred to had all the clinical findings, including increased nucleated red cells, of erythroblastosis but at autopsy no erythroblastosis was demonstrable. In excluding syphilis the mother's history and blood Wassermann reaction should be investigated. The infant should have a blood Wassermann and x-ray studies of the long bones.

Congenital Heart Disease. The cardiac hypertrophy, edema, dyspnea, and cyanosis may suggest the possibility of congenital heart disease. The presence of an organic murmur may be helpful, but, unfortunately, severe heart disease may be present without any detectable murmur. The total red cell count is normal or increased in congenital heart disease while an anemia is characteristic of erythroblastosis. Severe jaundice is not to be expected with a congenital heart. Marked enlargement of the spleen and liver should not be present except with heart failure. We do not know what the level of nucleated red cells will be in congenital heart disease. The subsequent course of the patient under consideration should allow a differentiation from erythroblastosis.

Intracranial Hemorrhage. The cyanosis, dyspnea, and muscular twitchings seen in erythroblastosis may suggest intracranial hemorrhage. In fact actual intracranial hemorrhage may occur as part of the bleeding tendency that develops in erythroblastosis. Pure intracranial hemorrhage can be differentiated from erythroblastosis by the absence of edema, jaundice, enlarged liver and spleen. Erythroblastosis with the symptoms suggesting intracranial injury but without bleeding will have a normal fluid by lumbar and subdural taps and the fluid will be under normal pressure.

Hemorrhagic Disease of the New-Born. In the past, many cases of erythroblastosis have probably been diagnosed hemorrhagic disease because of the bleeding that frequently accompanies icterus gravis. In hemorrhagic disease there should be no edema, hepatomegaly or splenomegaly. Severe jaundice should be absent. Unless there is hemorrhage into the central nervous system there should be no cyanosis. The nucleated red cells in the few cases that we have examined have not been increased but our series is as yet too small to establish this point.

Idiopathic Anemia of the New-Born. The possible relationship between erythroblastosis with its anemia that persists long after the acute symptoms have disappeared and idiopathic anemia of the new born is at present the subject of several investigations. It is for future studies to prove whether idiopathic anemia is an independent entity or whether it is one stage or phase of the erythroblastic process.

TREATMENT

The obvious treatment indicated in congenital hydrops is an immediate transfusion to correct the profound anemia that is present. Unfortunately death has followed so closely after birth that as yet no experience has been gained as to the results of such therapy.

In erythroblastosis of the icterus gravis type the treatment consists of early and frequent small blood transfusions. This immediately provides normal oxygen-carrying red blood cells to supplement the immature red cells of the patient's blood that are unable to carry their nor-

mal quota of oxygen. It also combats the mild anemia that is present. That this measure is effective is shown by the relief of dyspnea and cyanosis that frequently follows the transfusion. The fresh blood may also in some way permit the hematopoietic system to mature its cells before liberation into the blood stream.

The technique of giving this blood is very simple. Either parent may be used as a donor and it is not necessary to type or cross agglutinate the donor and new-born recipient. Thirty to fifty cubic centimeters of blood is drawn from the donor's vein into a large syringe in which about 5 c.c. of 2% solution of sodium citrate has been previously placed. The needle is now disconnected from the end of the syringe and one end of a small rubber tube is applied in its place. At the other end of the rubber tube is a 2 c.c. Luer-Kaufmann syringe with a small needle attached. The tube and small syringe are now filled with blood and the apparatus is ready to deliver its blood to the recipient. An area on the side of the baby's head is shaved and scrubbed. Light pressure applied by an assistant's finger just above the patient's ear causes the small veins in the temporal region of the scalp to become distended. The needle is now introduced into one of these veins and threaded a short distance into the vein. The plunger of the small syringe is withdrawn allowing the donor's blood to enter the barrel. The assistant forces the blood out of the large syringe by pressing on and rotating the plunger and the transfusion is completed.

In order to combat dehydration and to assist in the elimination of bile pigments it is important that fluids be forced by mouth and hypodermoclysis to between three and four ounces per pound daily.

Oxygen has been of little or no value during the periods of cyanosis and respiratory distress. Liver has been tried, but the results thus far are inconclusive.

In the convalescent phase of the disease the severe anemias may be treated by frequent small transfusions while the milder anemias respond well to oral administration of about 4 grams of iron and ammonium citrate daily.

CONCLUSION

Erythroblastosis is a congenital and frequently familial disease of unknown etiology involving the hematopoietic system. It runs the major portion of its course prior to birth and presents a confusing variety of clinical pictures depending upon the severity of the antenatal process and upon the stage the disease has reached when pregnancy is terminated.

The term "erythroblastosis" is descriptive of the common underlying pathology recognized in such apparently dissimilar neonatal conditions as congenital hydrops and some cases of icterus gravis. The pathological feature of congenital erythroblastosis is hyperplasia of the hematopoietic system with reversion to or continuation of the embryonic level of blood formation. There is hyperplasia of the bone marrow, and active foci of hematopoiesis may be found in the liver, spleen, pancreas, kidneys, adrenals, thymus, pituitary and lymph nodes. The circulating blood is flooded with immature cells of all forms, particularly nucleated red cells, and there is evidence of a varying amount of blood destruction. When the destruction of the red cells exceeds the production any degree of anemia may result up to the profound type often seen in the congenital hydrops variety of the disease. In what should seem to be a compensatory measure the heart may become greatly hypertrophied and the anasarca when present may be the result of cardiac decompensation.

The diagnosis of erythroblastosis is suggested at birth by the presence of a thick golden-yellow vernix caseosa. The placenta may be hypertrophied. Physical examination may reveal anemia, edema, jaundice, dusky cyanosis, petechial hemorrhages, and enlargement of the liver, spleen and heart. The blood in erythroblastosis will have an abnormal increase in the numbers of nucleated red cells.

The treatment consists in transfusion with whole blood at the earliest possible moment, and the forcing of fluids.

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DISCUSSION

CHAIRMAN WYMAN: The discussion of Dr. Clifford's paper will be opened by Dr. Frederick C. Irving, of Boston.

Dr. Frederick C. Irving, Boston: *Mr. Chairman, Ladies and Gentlemen*—Naturally I am not qualified to speak on this subject from the point of view of pediatrics, but since it is a not uncommon condition, occurring as Dr. Clifford has already said, about once in every 343 births, and since the obstetrician is the first person that sees the baby, and since the question of early diagnosis is a very important one, it becomes almost as much an obstetrical problem at the beginning as it is a pediatric one.

Dr. Clifford has already dwelt on the peculiar color of the vernix, as he has on all the other things about which I am going to speak. We do not know the cause of the color. We assume that it is due to staining from bile pigment, and, in the course of the next year, we probably will be able to find out by chemical analysis what the cause of that peculiar golden yellow color may be.

The next thing that the obstetrician notices is the size of the placenta. The placenta may be increased in size from various causes, one of them being congenital syphilis, but it is increased for a different reason in congenital syphilis than it is in erythroblastosis. In erythroblastosis it seems to be a compensatory mechanism to enable the baby to get more oxygen while it is in utero.

The obstetrician should then palpate the liver and spleen to determine whether they are enlarged, and he should also note the general condition of the baby, whether it has general anasarca or whether it is jaundiced or anemic. Of course jaundice and anemia may not appear immediately; they may be the development of the first few hours of extra-uterine life.

Taking all these factors into consideration, the question may be settled by a blood count, which, after all, is the determining factor. If the child has an increased number of nucleated red cells, it has an extremely good chance of having erythroblastosis. That is the most important diagnostic point.

When the obstetrician arrives at the conclusion that the baby may have erythroblastosis, he may then call in the pediatrist and steps may be taken to do everything possible to save the baby's life.

Chairman Wyman: Dr. Clifford's paper is now open for general discussion.

Dr. Kenneth D. Blackfan, Brookline: Dr. Clifford's contribution illustrates very clearly the importance of the obstetrician, pediatrist, hematologist and the pathologist working very closely together, for it is this "team work," having been stimulated under Dr. Irving's direction, which has resulted in the bringing together of four clinical syndromes heretofore having been considered as separate entities, and to relate them to a common pathological basis.

Dr. Clifford mentioned the relationship between the congenital anemia of the newly born and erythroblastosis. Of course it will be necessary to have further studies before we can speak, perhaps as positively, about this condition being on the same basis of this disturbance of the hematopoietic system as the others—edema and jaundice. A suggestion which is confirmatory of this relationship, however, has been made by Dr. Diamond from an experience in one family.

This mother had given birth to four healthy and normal babies and these children now are living and well. When the fifth pregnancy resulted in the birth of an infant, it was noticed shortly after having been discharged from the maternity hospital that the baby was very pale, and despite measures to relieve the anemia which increased rapidly, the child died.

The sixth pregnancy also resulted in the development of a severe pernicious type of anemia and the child was brought to the Infants' Hospital when about 17 or 18 days of age. There, as the result of frequent small transfusions, the anemia finally was brought under control and the child was discharged and is now living and well.

The seventh pregnancy also resulted in the birth of an anemic baby who was brought to the Infants' Hospital and likewise was returned home and is now well.

The mother having had this experience with her last three babies, refused then to go to a maternity hospital and said she was going to be delivered at home, so that she herself could make observations regarding the condition of this baby at birth. The child was born and when about 5 hours of age presented evidences of icterus gravis, and when 9½ hours of age was brought into the Infants' Hospital with all the signs and symptoms characteristic of that form of this hematopoietic disturbance. With transfusions and other measures the child made a satisfactory recovery, and the jaundice disappeared. When at the same age as the other two children, about 17 or 18 days of age, it was found that the hematological characteristics were identical with the hematological characteristics which have been regarded as typical of congenital anemia of the new-born.

This instance seems to connect very clearly in our minds the relationship between the two different stages with the icterus usually seen shortly after birth and with the signs of what is regarded later as anemia of the new-born.

Confirmatory evidences of this observation are found in the literature in a few instances in which at autopsy these babies with anemia of the new-born have exhibited intensive extramedullary hematopoiesis.

We are really definitely indebted to the group at the Boston Lying-In Hospital for having called attention to the importance of recognizing these conditions at birth, because that is the time when there is opportunity to benefit

them by the therapeutic measures which Dr. Clifford has suggested.

Dr. Warren R. Sisson, Boston: *Mr. Chairman*—I cannot let this opportunity go by without expressing my interest in this work and complimenting Dr. Clifford upon the real contribution which he has made in calling to our attention the importance of this disease which we obviously have neglected to observe in its various manifestations, especially in its very early stages.

The thing of course that interests us all, Dr. Clifford has very wisely omitted to discuss, namely, the etiology of the disease. One cannot help wondering whether this is a disease at all or whether it is just a symptom of some underlying physiological process which is causing these various manifestations.

In this connection I should like to ask Dr. Clifford and Dr. Stuart if any really intensive study has been made of the diet or the past history of the mothers of these patients in the prenatal stage.

In regard to therapy, I was discussing the subject last week with Dr. Cooley of Detroit who has been very much interested in this and other hematopoietic diseases. He has removed the spleen in one of these babies and noted very favorable results. He stated that the next case he saw he would treat in this way.

I should like to hear Dr. Baty's or Dr. Blackfan's opinion of this form of treatment. It hardly seems a feasible procedure to me.

Chairman Wyman: Dr. Baty?

Dr. James M. Baty, Boston: I do not think I can add anything to Dr. Clifford's excellent presentation, but in answer to Dr. Sisson's question about the splenectomy in these children, I think Dr. Blackfan would agree that we feel that that is quite definitely not indicated in erythroblastosis because the enlargement of and the changes in the spleen are simply a part of the general process involving the entire hematopoietic system, and I cannot conceive of any very definite benefit that would derive from splenectomy. Also, it is rather a strenuous process for a new-born infant. I think that the result in one or even a few cases would not be of any particular value because with Dr. Clifford's two or three cases that have recovered, and the ones that Dr. Blackfan mentioned, which recovered, we have been able to cure simply with transfusions. I think that the transfusion idea cannot be emphasized too much. One of these children that Dr. Clifford had at the Lying-In was transfused three or four times, I think, in a period of two or three days, much more frequently than you would think necessary from the point of view of the anemia simply, because the child did not have a very severe anemia, around 4,000,000 to 5,000,000 red cells.

Dr. Karlton G. Percy, Brookline: As a meager contribution to this excellent paper I wish simply to present three cases that I happen to have had of this same condition of erythroblastosis, manifesting, as Dr. Clifford has brought out, the previous different disease entities.

The first one was a second child of a parent of about 42, that was born at the Massachusetts Women's Hospital, which had been given 30 c.c. of blood intramuscularly, and on the third day began to manifest anemia and cyanotic spells, which showed at that time a definite picture of erythroblastosis, with about 45 per cent erythroblast cells. It was transfused that day by Dr. Baty and it had marked and diffuse hemorrhage, necessitating another transfusion, and a large transfusion of 100 c.c. within 12 hours, and again at the end of 24 hours. It looked as if we were getting by, but finally it had a diffuse cerebral hemorrhage over the whole cortex and died.

It was a picture which simulated a hemorrhage of the new-born, but a blood picture which was entirely characteristic of this disease which Dr. Clifford has spoken of, and when it came to an autopsy it was proved as such.

The second was one which was a hydrops congenitalis which was seen at the age of 12 hours in extremis and died before a physical examination was finished, with blood picture which was characteristic and upheld by autopsy.

The third was an icterus gravis, but did not appear as such until the third day. It was given three transfusions within 24 hours and died. It was a typical picture.

Looking back before the time when we were doing many blood smears I can remember two cases of icterus gravis which were more or less chronic in type. One went along for 2½ years, was seen by a surgeon, and was not diagnosed as a congenital erythroblastosis, and died.

Another one that interested me had jaundice for 5 months, with marked anemia, and eventually got well without any further treatment than simple medical means of iron and of feeding regulation.

So, looking over my own records, from the standpoint of the pediatrician who does not see every new-born but sees those to whom he is called, I have a percentage of 3 out of 180 cases.

Chairman Wyman: Is there any further discussion? Dr. Clifford, will you please close the discussion?

Dr. Clifford: As Dr. Sisson mentioned, the subject of etiology was intentionally avoided because of its intricacy. As yet we have no true conception as to the primary cause of erythroblastosis. We think it is a congenital defect in the developing hematopoietic system

that starts a vicious cycle of abnormal cell production and cell destruction.

There have been a number of studies in the past in connection with the cases of congenital anemia that occur in the icterus gravis type of erythroblastosis, where attempts have been made to explain the condition as the result of dietary deficiencies, anemias, toxemia, tuberculosis, or syphilis in the mother, but the consensus of opinion, and our opinion from our own experience, is that there is no connection whatsoever between these conditions and the occurrence of erythroblastosis. In fact, one case has been reported in the literature in which one of twins had erythroblastosis while the other was perfectly normal.

In our opinion a therapeutic splenectomy is certainly not indicated at the present time, because when we observe these cases from their very first symptom we notice that the icterus gravis type of case is usually born without jaundice and that the spleen is then just barely enlarged, if at all. As the jaundice develops the spleen very rapidly increases in size and, as the patient recovers, the spleen subsides. In other words, it looks as though the spleen were merely removing the abnormal cells, and is not the primary cause of the disease. It seems to act as a scavenger organ to rid the blood stream of the defective erythroblasts released by the hematopoietic system.

CHAIRMAN WYMAN: The next paper is entitled "The American Academy of Pediatrics; its Purposes and Scope," by Dr. John Lovett Morse, of Boston.

THE AMERICAN ACADEMY OF PEDIATRICS, ITS PURPOSES AND SCOPE*

BY JOHN LOVETT MORSE, M.D.†

WHEN President Hoover initiated the great movement for the improvement of the health and welfare of the children of this country, which culminated in the White House Conference, it at once became evident that there was no organized body of pediatricians in the United States which could be called on to undertake and carry on this movement or to give authoritative advice. The American Pediatric Society is a small elective society, composed largely of teachers and laboratory workers, which has never taken any active interest in public health matters. The House of Delegates of the American Medical Association does not allow the Section on Pediatrics to do anything except to hold scientific sessions. It was the crying need for such an organized body of the pediatricians of the whole country which led primarily to the formation of the American Academy of Pediatrics. It is anticipated that this body will ultimately include in its membership every thoroughly qualified pediatrician in the United States. A very considerable proportion of them, especially in the South and Middle West, are already members.

According to the Constitution "The object of the Academy is to foster and stimulate interest in Pediatrics and correlate all aspects of the work for the welfare of children which properly come within the scope of Pediatrics. The Academy shall endeavor to accomplish the following purposes:

"To establish and maintain the highest possible standards for pediatric education in medical schools and hospitals, pediatric practice and research;

"To perpetuate the history and best traditions of pediatric practice and ethics;

"To maintain the dignity and efficiency of pediatric practice in its relation to public welfare;

none of which objects is for pecuniary profit."

It is noteworthy that the purposes of the Academy are largely altruistic. While this is true, if these purposes are attained, their accomplishment will redound to the benefit of the pediatricians themselves. The American public has become child welfare minded. It now demands that active measures be taken for the preservation, protection and guidance of children and will see to it that they are taken. In the past, such measures have been undertaken largely by lay organizations and the public health authorities without proper advice or assistance from the pediatricians. They should have led all of these movements. As individuals they have had a small part in them, as a body none. It is time that they did and that they received proper recognition. It is the intention of the Academy to see that, as far as possible, they do. When they do, one of the perils of state medicine will be avoided.

In order to carry out the purposes of the Academy there are a number of committees, the members of which are selected from all over the United States. Among these committees are those on Medical Education; Hospitals and Dispensaries; Relation to White House Conference; Relation to Philanthropic Agencies, Welfare Workers and Public Health Authorities; School Health and Hygiene; and Mental Hygiene.

The Academy is also divided into five regions

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—East, South, Midwest, West and Canada—in charge of regional committees. The reason for dividing the country into regions was that it was felt that each had its own pediatric problems which could be better handled by the physicians living in the region than by a general committee. It is also the intention to hold clinical meetings of two or three days' duration once or twice a year in each region, in order that the pediatricians in each region may become better acquainted with each other and mutually stimulated in their work.

There are also state committees which are selected by the regional committees. One of the duties of these committees, as stated by the Executive Board, is "to interest themselves in all problems pertaining to pediatricians, and especially to coöperate with all agencies concerned with child welfare and child health in their respective states." They know local conditions so well that they are in a better position to carry out many of the purposes of the Academy than any national body can possibly be. In carrying them out they will not only benefit the states in which they live, but also improve their own position.

It is plain that the American Academy of Pediatrics has laid out a very ambitious program. I believe, however, that with sufficient energy and time it can be carried out. Its fulfillment will mean much for the children of the country, in that those who are interested in their care and protection will be assisted, supervised and directed by pediatricians, as they should be. Furthermore, raising the standard of pediatric education will increase the value of the advice which the pediatricians give and thus indirectly help the children. Finally the pediatricians will profit by taking the place in public health and child welfare matters which properly belongs to them.

My paper on the purposes and scope of the American Academy ends here. Various doctors have asked me what were the requisites for membership in the Academy of Pediatrics and I thought perhaps it might be well to say just what they are.

A candidate to be eligible as a Fellow of the American Academy of Pediatrics must meet the following qualifications and requirements: A minimum of five years in pediatrics; evidence of fundamental training; productivity in one or more of the following: teaching, investigative work, clinical studies, publications, and public activities relating to pediatrics; clinical experience and standing as determined by Fellows in his region. Governmental activities related to pediatrics shall be considered as proper qualification for fellowship.

Now, how can a physician get into the American Academy of Pediatrics? He must first be proposed by two members of the Academy in his region who are not officers. His application is then sent to the regional committee and the regional committee then sends a letter to every member of the Academy in that region, asking their opinion. The regional committee then decides whether he is eligible and, finally, he has to pass the executive board.

There was one modification to the requisites which was made last winter and that was that a pediatrician who lived in a small place, so little that he could not be expected to make his living entirely out of pediatrics, would be accepted.

CHAIRMAN WYMAN: Before discussing Dr. Morse's paper we will proceed with the next paper.

DR. MORSE: May I interrupt for just a moment?

CHAIRMAN WYMAN: Excuse me.

DR. MORSE: Dr. Sisson asked me who the members of the regional committee were in the East. I am ashamed to say I do not know the names of the entire committee, but Louis C. Schroeder of New York is the chairman.

CHAIRMAN WYMAN: The next paper is "The Program of the State Committee of the American Academy of Pediatrics," by Dr. Harold C. Stuart, of Boston.

AMERICAN ACADEMY OF PEDIATRICS*

Program For State Committee**

BY HAROLD C. STUART, M.D.†

THE great strides made during the first quarter of this century in the prevention of infant and child morbidity and mortality, were very largely due to community enterprises. Improvements in sanitation, in the water, milk, and food supplies, and in the control of communicable diseases contributed greatly toward the results obtained, and were largely brought about by group effort. The higher economic and educational levels of the general population were important factors.

In recent years it has become apparent that future progress will depend more and more upon health service rendered to the individual.

*Presented at the Section of Pediatrics at the Annual Meeting of the Massachusetts Medical Society, at Boston, June 10, 1932.

**Members of State Committee: Warren R. Sisson, M.D., Chairman, Edwin T. Wyman, M.D., and Harold C. Stuart, M.D.

†Stuart—Associate Physician, Children's Hospital. Visiting Physician, Infants' Hospital. For record and address of author see "This Week's Issue," page 161.

Public Health, and other community organizations, have recognized this necessity and are tending toward the individualization of their undertakings. There are, however, many reasons for believing that the personal physician is in the most strategic position for supervising the health of normal children. Other things being equal, he is the one best fitted to determine what an individual's health needs are, and how they may best be met. Thorough and systematic health supervisory service is not generally offered by the physicians of our State to the children whom they consider members of their medical practice. If anyone doubts the accuracy of this statement he need only refer to the recent publication of the White House Conference entitled "Health Protection for the Preschool Child." It may be said that practitioners have for various reasons generally resisted, rather than encouraged, the growing popular demand for such service.

The State Committee of the American Academy of Pediatrics realizes that the provision of better health service for children is one of the primary objectives of the Society. It has adopted a number of resolutions which express its sentiments and objectives, and this purpose is shown in the following quotation from these resolutions:

> It is one of the principal objectives of the Academy to promote higher standards of pediatric practice throughout the State, and to make this service available to an increasing number of children in the State.
>
> Preventive pediatric supervision of normal children is a fundamental part of pediatric practice. Therefore, improvement in the amount and quality of such service is an objective of the Academy. Through its general extension and improvement, there is great promise of further reduction of morbidity and mortality, and better protection of normal growth.

The Committee proposes to secure the extension of this service in the offices of the private practitioners, in so far as is possible. It believes that extension in this way will best serve the interests of the children, as well as of the physicians of the State. But the Committee is not unmindful of the possibilities for rendering effective health service in the more usual community conferences; and it proposes to aid and facilitate the extension of such organized conferences in communities, and for the use of individuals, who are unable because of economic or other reasons to secure adequate service from their own physicians. The following extracts from the resolutions may be taken as an indication of the Committee's attitude on these subjects:

"In the absence of satisfactory service available at reasonable cost from their private physicians, many parents have been compelled to seek such service through other agencies.

"Owing to urgent popular demand, public authorities as well as lay organizations have done much to extend the availability of health service for children throughout the State.

"The Academy accepts the following objectives of the White House Conference as expressed in the Children's Charter:

> "For *every child* full preparation for his birth, his mother receiving prenatal, natal, and postnatal care; . . .
>
> "For *every child* health protection from birth through adolescence, including periodic health examinations, . . . protective and preventive measures against communicable diseases, . . .

"Medical health supervision of normal children is of sufficient value, both to the individual and to the community, to justify its provision for children in poor economic circumstances at municipal expense. It is recognized that, in addition to the indigent who require medical care in illness as well as health supervision, there is a borderline class who can pay for medical care in occasional illness, but who cannot regularly pay for health supervision.

"For those unable to purchase private medical health supervision, community health conferences have proved effective. Their extension to more adequately meet the needs of the State is desirable. It is essential that these conferences not only be under the charge of competent physicians, but that they give regular personal attention to the individual children and to the instruction of their mothers. By competent is meant not only general medical fitness but special training and interest in the problems of both normal and sick children.

"The present administration of the Massachusetts Department of Health is of like mind with the Academy in believing that wherever possible health service should be provided for children by private physicians, and in being anxious to excite the interest of practicing physicians in this field.

"The public is determined to have medical health service available for children generally. It is for the medical profession to demonstrate that this can best be obtained through private initiate and in connection with the private practice of medicine."

An important question which had to be dealt with in the very beginning concerned the field of health service itself. What constitutes ade-

quate health service for children? The Committee believes that to be effective this service should be both comprehensive and continuous throughout the entire period of growth and development. This is expressed in the following:

"Health supervision is desirable throughout the entire period of growth, and, therefore, should start early in pregnancy and continue through adolescence. It should include periodic examinations with search for defects and incipient disease and with consideration of both physical and mental progress. It should also take into account the child's heredity as well as his environment, and cover all aspects of physical care and training."

The Committee is, therefore, not primarily interested in making a drive for the extension of particular items of health service (such as diphtheria inoculations or school entrance examinations). It is rather interested in having the physicians become health councilors in the fullest sense of the word. It believes that they should be interested in following the growth and development of individual children, and in relating these to their heredity, their physical environment, and their health experiences. They should also accept responsibility for supervising their feeding, their daily routine, their habit formation, and their protection from infection. When this kind of service is provided regularly, the problems of inoculations, correction of defects, and the like are taken care of as a matter of course. In this connection, the Committee plans to prepare a brief outline to serve as a guide to physicians, covering minimum standards for infant and child care.

The Committee hopes to bring not only the need, but also the practicability of offering this service directly to the attention of the practitioners of medicine and to interest them in providing it. It believes that it can convince them that this is not only a responsibility but an opportunity. It would like to have your coöperation, as well as that of all physicians interested in children, in carrying out this undertaking.

The following resolutions suggest possible channels through which the Committee may work to bring about this interest:

"Health service is subject to regulation and the application of efficiency measures, not applicable to the care of sick children, for which reason it can be offered by practicing physicians at considerably less than sickness rates. It can, in fact, be offered at rates which should not prove prohibitive for a large proportion of the population. There has been no general attempt on the part of those physicians who offer the service, to make it available at a cost within the economic reach of any but the well-to-do.

"That the Committee outline a plan for organization and procedure which would make it possible to render good service at reasonable cost, and still allow adequate remuneration.

"That the Committee seek the coöperation of all members of the Academy within the State in an effort to demonstrate to the local practitioners the desirability of their offering health service at reasonable cost to the children in their practice. Such function should be presented as desirable not only from the standpoint of the children but also from that of the profession as well.

"That the Committee consider other ways and means of bringing this service to the attention of the physicians of the State, of securing their adoption of reasonable standards, and of providing them with educational opportunities to fit them better to carry out this program.

"That the Committee study the possibility of establishing a demonstration area within the State where they could attempt through good local coöperation to have at least minimum standard health service available to every child, as an integral part of the local practice of medicine."

There are, undoubtedly, within the State many physicians who would like to provide this kind of service as part of their practice, but who find themselves unfitted, by training or experience, to do it effectively. Care of the well child requires a different approach, a different interest, and a moderate amount of additional knowledge to that required for curative medicine. Physicians who have concentrated their attention on curative medicine, or who passed through medical school at a time when the normal child was given little consideration, often find themselves at a loss as to the objectives, content, and methods of health supervision. There is a natural tendency to shun, or even to discount the value of work which we do not feel fitted to carry out effectively. Our Committee appreciates the need for opportunities to become familiar with normal children and with the procedures involved in the conduct of health service. It hopes to be of assistance to such physicians in the following ways:

(1) In the preparation of literature that will cover briefly and very practically the subjects dealt with in health service.

(2) To provide opportunities for physicians to visit Health Conferences in Boston, or elsewhere in the State; and to observe the kind of service that is rendered.

(3) To bring these subjects before the attention of local medical societies.

Our Committee stands ready to coöperate in every possible way with any physician who has a sufficient combination of medical and civic pride to desire for every child in his community at least minimum standards of modern health service as an integral part of the local practice of medicine.

A second purpose of the Academy, which the Committee recognizes as offering a useful field of service, is that relating to child health work in the various allied fields of social service. The Committee has not yet matured any definite plans for activities along these lines, but it believes that it should attempt to coöperate with extra-medical organizations whose programs are intimately related to child health. In this connection it will be definitely carrying on certain of the objectives which the White House Conference so clearly showed to be necessary. The chief ways for effective assistance in this direction would seem to be to sit, as representatives of the pediatricians of the State, in conferences where other organizations are represented, and to pass upon the medical desirability of plans prepared and being carried out by these organizations, and to secure the coöperation of practicing physicians in their application. This purpose is formulated in the following:

> "That the Committee attempt to coöperate actively with the State Department of Health, as well as with other organizations similarly minded, in efforts to improve the child health service available throughout the State, in making it available in those communities where there is no adequate service at present, in passing upon the medical desirability of plans prepared by these organizations, and in seeking the coöperation of practicing physicians in plans that are acceptable."

The White House Conference on Child Health and Protection has done much to arouse public interest in preventing unnecessary illness among children. It is a proper function of the practice of medicine to provide the necessary preventive medical service, and the medical profession should adopt a position of leadership in the whole child health movement. The Massachusetts State Committee of the American Academy of Pediatrics, representing a large number of the pediatricians of the State, is anxious to coöperate in furthering these ends.

Discussion

Chairman Wyman: The discussion of Dr. Stuart's paper will be opened by Dr. Warren R. Sisson, Boston.

Dr. Warren R. Sisson, Boston: *Mr. Chairman and Members of This Section*—Dr. Morse and Dr. Stuart have, I think, covered practically all of the ground which represents the policies of the Academy of Pediatrics. When the local committee was formed there was some doubt in our minds as to the exact function which we were to perform for the society and for the regional members. It seemed to us that there were enough organizations and that it was very unwise to start another in the department of public health activities. We have been, therefore, very slow in trying to evolve what we thought would be a most effective way to carry out the functions of the Academy as already postulated.

One of the thoughts that occurred to us was that the physicians generally have been too lax in their interest in public matters. Most of the work has been done by an organization which has carried out, I should say, most of the effective work in the community and the physician or pediatrician himself has done very little to supplement the activities of the organizations. We have felt, furthermore, that this work could be more effective if we, interested in general pediatric matters, could give a more personal interest and in some way become more closely connected with the work and the private practitioner whose interest had never been thoroughly aroused.

It is interesting in this connection to note that during the past few months the medical profession in Massachusetts has been somewhat critical of the activities of the Department of Public Health, thinking that possibly it had gone a little bit beyond its scope in certain of its provinces. We, however, have felt that it was not the fault of the Public Health Department but that it was our fault for not being more active, and that, as Dr. Morse has already said, if we did not soon "get on the band wagon" we would lose an opportunity to contribute to this very important Department of Public Health activity.

So, instead of criticizing the Department of Public Health we as a committee have asked to confer with the Department of Public Health and already on two occasions have sat and discussed the propositions which Dr. Stuart has so clearly outlined.

In this connection I hope that Dr. Bigelow will tell you perhaps a little more in detail what we propose to do and how much we depend upon the committee and the members of the Academy to coöperate in this work.

We have felt that whatever we do, must be started in a very small experimental way, and it has been proposed by Dr. Stuart and others that we shall join the Department of Public Health in one of their projects. There has been formed, as you may know, a unit in the Ayer district, consisting of 14 towns, where the main object is to supervise the public health of the communities and to elicit more interest in child welfare. It is now hoped that next fall,

starting with an oration by Dr. Morse who is in the strategic position to arouse interest on the part of the local practitioner, we may go to this district and arouse the coöperation of the local practitioners.

The organization is already well established and we hope to take an active part in the conduct of this more or less experimental public health unit. We propose to help in the administration of the conferences, and, as Dr. Stuart has intimated, we propose to have literature available which will give the practitioner the standards of infant feeding and the standards of physical examination, and so forth, so that he may have more opportunity to know the methods which we think should be carried out.

In closing I wish to say that I feel we are really in an unusual position in this State. We have, first of all, a most coöperative Department of Public Health; in the second place, we have Dr. Stuart—and I cannot let the opportunity pass without saying that he is in a most strategic position to help us in this work because of his familiarity with the White House Conference and due to his interest in his own special department here.

CHAIRMAN WYMAN: Dr. Stuart's paper is now open for general discussion.

DR. RICHARD M. SMITH, Boston: *Mr. Chairman*—I had not intended to say anything but it does seem to me that both Dr. Morse and Dr. Stuart have mentioned something that might properly be emphasized, namely, the apparent indifference of the medical profession to the opportunity in this particular field.

We have talked a good deal in recent years about the disappearance of and the loss of prestige of the general practitioner, but if we look back to the position which the general practitioner formerly occupied in the community, and which we would like to see him regain, we realize that he was more than a person who simply cared for the sick; he was the family counsellor, he was the person to whom the families who looked to him for care in illness went when they were in any sort of trouble; in other words, he was the person who was able to give them sound advice with reference to the general conduct of their lives so far as health entered into it—and after all health enters into a very large proportion of our activities either directly or indirectly.

As medical science has progressed the doctor has become, of necessity perhaps, more and more absorbed in the strictly scientific application of medical knowledge and he has become so absorbed in attempting to practice medicine strictly that he has allowed to slip from his influence this other service which formerly he performed so universally and so acceptably.

The pediatrician is, perhaps, the man who has most clearly seen that an opportunity to regain this field lies in the application of a greater interest to the whole child rather than confine his attention to the care of the child when he is sick. It seems to me that this renewed activity, which has been stimulated by the White House Conference and this very carefully thought out and constructive program of the Academy, offers an opportunity for a real demonstration of what can be done for the child, what can be done by the physician in regaining the position of general adviser and helper that the family physician used to have.

We greatly need this outline which is being prepared in order that all of us may clearly understand the science and essential techniques in this field of health supervision because after all the information which we need and the methods which we use are quite different from those which are employed in the cure of the sick. I think that the plan for a demonstration in this particular work in some community in the State is an excellent thing. The opportunities which this whole general program offers for furthering the interest in child health and for developing the fields for service by the physician are very great.

DR. GEORGE H. BIGELOW, Boston: *Mr. Chairman*—Of course the State Department of Public Health is very vitally interested in this matter. We in Massachusetts always seem to find some reason to congratulate ourselves, personally, and sometimes I think we spend a good deal of time "narcissusizing" ourselves, or whatever that disease is of looking into pools; but I think in this particular case we have cause for congratulation because this newly organized academy has its president here in Massachusetts and certainly if it is to function effectively in any state it should so function here. I think, therefore, that we have a real responsibility, with this added advantage, that the other states do not have of making this coöperative effort effective.

Of course the Committee fits in splendidly with what we have been thinking about with a group from the obstetrical section this winter, Dr. Stuart's suggestion that we outline the content of the health supervision of children is admirable.

Dr. Sisson has suggested that there might be some discussion about the plans that we have in mind with this Massachusetts Committee.

Perhaps it is a little premature to announce any definite program because the program must vary in the different communities and must have its inception in a frank discussion with the medical profession in the area involved. Some of our programs in the past have been talked over with everybody except the doctors, have been initiated, and then some five or ten years afterward, the doctors have been told what it is all

about. We must reverse that process. In some places this has been done because there has not been any machinery for getting hold of the doctors. With these committees such machinery is given us.

There has been one point which has been discussed a good deal and on which we have not, I believe, come to complete agreement, namely, in communities where you get coöperation from the doctors should there be any organized service in clinics? If you want to whitewash it a little, call them conferences. However I think that is an important distinction between these two terms, since "clinics" suggest pathology and "conferences" suggest exchange of ideas or education. So, I think conference is the better term. I have felt very definitely that to go into a community and say that there should be no well child conferences would be throwing away a very valuable educational implement which we have.

I am entirely impatient with a lot of the so-called conferences. They are half-baked pediatrics clinics. The only person who likes them is the druggist who gets flooded with prescriptions. They are a parody on supervision of the well, because they really are supervision of the sick.

Then there is another drawback to many of them in that you get a bunch of repeaters that keep coming year after year. They are only a fraction of the children in the community. I think the suggestion we picked up in Tennessee is very good, that the number of visits should be definitely limited, and if the purpose of education at the conference is not accomplished after those visits either the conference is useless as an educational medium or the people are adamant against education. They come for a limited number of times in order that the educational value of the conference may be accomplished. Out of that an appreciation on the part of parents of the value of this service should be so aroused that the service will then be obtained from the private doctor's office if the private doctor is interested in giving the service. Plenty of doctors find well children dull and I think they ought to admit it. Nobody is efficient in that which does not interest him and the children ought to go to people who do not find that sort of work dull.

Another value of the conference is the education of the physician in the technique of the supervision of the well child which is all comparatively new. It needs a special point of view and the value of the teaching conference in these matters of the profession is very great.

I think that there are many communities in the State that want nothing of conferences or clinics for the well child or anybody else, but I feel that this professional group will be of great help in getting this program over.

To be able to go into a given community and meet the profession, with Dr. Morse and with the members of this committee, is half the battle in obtaining the confidence of the doctors. They know that they can differ with us and have a very good chance of being right but they cannot differ in these professional fields with these informed people and have any chance of being anything but wrong.

Dr. George L. Richards, Fall River: One of the problems with which you always have to contend is the fact that the health officer is considered by many physicians as in a way their competitor, as though he were taking business from the physicians.

The problem of coöperation with the health officer is a very real one as he may with the best of intentions and without in the least meaning to, appear to be a critic of the local physician. As a representative of the State his remarks are liable to be quoted and passed along and not always accurately. Disagreeable as it may be, the average physician in the local community has to get his living out of the practice of medicine and these health examinations, while intended to help him, may appear at times to be working the other way. The successful health officer should take every means in his power to get the coöperation of the local profession and should make it very clear to them that he comes to help and not as a critic or a competitor.

Dr. Fred H. Allen, Holyoke: Dr. Sisson suggested that it might interest you if I were to say a few words about Child Welfare work in Holyoke. This work has been carried on for about 21 years and is unique in some respects. A few practical points may be of interest.

One point is in regard to organization. The work in Holyoke is under the care of the Child Welfare Commission which was created by a special act of the State Legislature. This came about because of the fact that at our start the city financed the work entirely, and in 1919, I think it was, the anti-aid bill was passed which prevented the city from giving any money to a private organization for charity. Consequently, the Mayor and some of those interested came to Boston and a bill was passed through the Legislature creating a Child Welfare Commission in Holyoke, consisting of three physicians and three laymen, who have functioned since that time. The financial problem is entirely eliminated because our budget is furnished us each year entirely by the city.

This Commission must meet each month, approve all bills, and decide all policies of the child welfare work.

One of the most important things, we have found, is the obtaining and keeping the confidence of the physicians. We have found that it is very essential not to treat the sick babies ourselves but to refer them back to their family

physicians; otherwise we cannot keep their approval and maintain their coöperation.

Another point, which we feel is very important, is keeping the work free from politics. I think that point was in mind with the Legislature when that Committee was created, as it states in the charter that no representative of the Commission shall receive any financial compensation. If there is no financial compensation the poorer class of physician is not politically minded to obtain a place on the Commission for the sake of the money he gets out of it.

As proof of the practical working of this Commission I would say that the infant mortality in Holyoke has dropped from 150 per thousand in 1910 to 47 per thousand in 1930. Exactly what it was in 1931 I cannot say, but it was somewhere around 50.

We have obtained the confidence of the people to such an extent that we now supervise over half of all the children in the city. The prenatal nurse reports that for the past four years she has lost no babies whose mothers she has supervised for four months before the baby was born. About two-thirds of all the babies under the care of the prenatal nurse are breast-fed entirely for a period of at least four months.

Dr. Maurice T. Briggs, Lynn: I think it might be interesting, inasmuch as the previous speaker has given the point of view of men who are outside of Boston in the smaller communities, to say something about the situation in Lynn.

Whether the doctors like it or not, a health or child conference was formed there a good many years ago because a wealthy philanthropist died and he wanted to leave some money for a memorial and left it to form this health conference. It has expanded in Lynn until there are five or six conferences a week. I do not know, but there may be more now because the conference has grown and the calls I think last year were about 150 at the conference each week.

There was a paid social secretary who received a salary for running the clinic; there were four or five nurses who were in the clinic and received salaries, but the physicians did not receive any salary at all. The physicians were expected to give time to the clinic. The secretary felt that if she increased the conference every year 10 per cent or 15 per cent or 20 per cent that that would be a great benefit and that her salary would be raised as a result of that.

No effort was made—I do not know now because I resigned from that clinic some five years ago—no effort was made up to the time I resigned to do anything economically in the clinic; that is, I mean anybody who came could come, if the wealthiest family in town wished to come to the clinic they were welcome and the nurse was glad to have them. At one time, just out of curiosity, I counted twenty-five who came to the clinic and ten of them came in automobiles. Whether the situation has been changed I do not know, but am told that it has not.

The Salem situation is a rather interesting one. I have charge of the clinic there and it is financed by a very wealthy woman who wishes to control it herself entirely. She also wishes to have it run along the lines she is interested in, whether the doctors like it or not, and if they do not wish to handle it that way, she is very much displeased. Dr. Bigelow and I had a discussion on that subject at one time.

The conference in Salem has always treated children with slight illnesses, along with the sick children, but an effort has been made to refer the cases back to the physicians as far as possible. In that conference there has been a certain amount of antagonism from the doctors and, as a result of that antagonism, we have been very careful to take nobody at the clinic who is not referred by a physician. When anybody comes, we immediately call up the physician and ask if it is a case that should be treated at the conference.

The situation at Danvers is also interesting. The social workers, that is, the women socially-minded in Danvers, decided that they needed a health conference and so they formed one, but none of the physicians—perhaps on account of professional jealousy—wished to take charge of it. So the nurse took charge of it and she has fed the children there. I do not know what the economic arrangement is, but I am told they take anyone who wishes to come to the clinic.

This nurse came down and worked at the Salem clinic with me for a while and then went back and now understands the feeding of children. That is the way the situation is handled there.

I hoped that Dr. Merriam would speak. He said that the situation in Framingham, where he runs the conference, is that he takes everybody who wishes to come and draws no economic line as to who shall come.

The whole thing is tremendously complicated by the fact that the general practitioners are somewhat opposed to anybody else feeding babies except themselves. When I first went to Lynn twelve years ago I found that if I fed a baby, or a baby was brought to my office, the general man felt that I was unethical in treating his case; he felt that the entire family belonged to him and that I had no right and was an interloper. On the other hand, if the grandmother or nurse fed the baby it was all right. At a certain local hospital the nurse feeds the babies. I think it is fair to state here that in both Salem and Lynn Hospitals there is an economic supervision of cases and only the poor are treated in the clinics. This is the whole problem as I see it. If some uniformity of economic supervision of the clinics could be established under the leadership of Dr. Stuart, Dr. Wyman, Dr. Sis-

son and Dr. Bigelow, I believe we would all be very glad to have it. I feel that the State should supervise the clinics, not run them.

CHAIRMAN WYMAN: Any further discussion, Dr. Morse?

DR. MORSE: I wish simply to emphasize the fact that the primary object of the American Academy of Pediatrics is to improve the health and welfare of the children of the country. It has felt that the doctors, largely on their own account, have failed to take the leadership which they should have taken in this public health movement. It hopes in some way to rouse the physicians to take their proper place. Judging from the discussion, the details of just how it is going to be done are beyond me.

DR. WYMAN: Dr. Stuart?

DR. STUART: I would like to say a word in regard to the question Dr. Bigelow raised as to whether there should or should not be a conference in the community. We are not far apart on that point, because we are not opposed to having conferences held in these various communities. Our original idea, however, was that the well baby conference, because of the way it has been run in the past, acts as a red flag to physicians and it was a question of how we should enter the community. We felt that if we first started a public health conference and then tried to get the doctors in the community interested we would encounter opposition from the start.

We feel very strongly that these conferences are desirable and if properly run are extremely effective and that they fit into our program perfectly well. The fundamental question is in which way the best kind of service is rendered if everything else is equal, in a conference run by the community and manned by outside physicians or by the family physician. We feel that we are on perfectly firm ground when we take the position that if possible the child should receive this service from his own physician. We do believe that a conference serves a very definite educational purpose and we are interested in having it established in the community for that reason.

The suggestion which Dr. Bigelow made, that the number of visits allowed to any one baby be limited, seems a very good one to try out. On this basis any baby in the community will be allowed to come to the conference for three or four visits. Thereafter it will be excluded from the conference unless it comes with a letter from its own physician indicating that he is not prepared to render health service to that child and would like to have the conference take over his responsibility; or unless the family cannot afford to pay a moderate fee. Under those circumstances the conference should continue to provide the service, because we have adopted the attitude that it should be available to every child. That is our primary interest.

CHAIRMAN WYMAN: We will now go on to the next paper, which is: "Can Fulminating Tracheobronchitis be Cured?" by Dr. Lyman Richards, of Boston.

CAN FULMINATING TRACHEOBRONCHITIS BE CURED?*

BY LYMAN RICHARDS, M.D.†

IN the attempt to answer such a question as that embodied in the title of this paper, one must first of all define what is meant by fulminating tracheobronchitis, and secondly postulate certain criteria implied by the word "cured". I shall therefore begin by presenting to you the clinical picture of this disease as we have observed it at the Children's Hospital and supplementing it with a consideration of the therapeutic problems involved in the effort to restore the patients to normal health. From this standpoint, a cured patient is one in which, after recovery from the initial bronchial obstruction, no residual pulmonary infection remains, and whose respiratory tract has resumed its normal physiological function.

Fulminating tracheobronchitis is an acute descending streptococcus infection of the respiratory tract characterized by a high febrile reaction, general toxemia, and an intense inflammatory change in the mucous membrane of the trachea, bronchi and bronchioles, the latter accompanied by the formation of a sticky, gummy, often glue-like exudate or secretion, which partially or completely occludes the bronchial airways. The occluding secretion may extend upward to become attached to the glottic walls of the larynx or downward to fill the terminal bronchial capillaries and hence to produce an interstitial bronchopneumonia.

Symptomatically the onset of the disease is quite typical and characteristic. A child, most often between the ages of two and four, previously in good health except for possibly a slight head cold, wakes up at night with the symptoms of spasmodic croup. There is the usual inspiratory stridor with hoarseness and often the barking cough which make up this well-known clinical picture. Foreign body in the larynx, always a possible diagnosis with this symp-

*From the Bronchoscopic Clinic of the Children's Hospital. Read before the Section of Pediatrics at the Annual Meeting of the Massachusetts Medical Society, at Boston, June 10, 1932.

†Richards—Surgeon in Otolaryngology, Children's Hospital. For record and address of author see "This Week's Issue," page 151.

tomatology of sudden onset, can usually be excluded when symptoms arise after the child has been put to bed in perfect comfort. Classical treatment for spasmodic croup, usually and naturally applied to the situation, does not relieve the obstruction, and, on a physician being summoned, the next natural inference is diphtheria, for which antitoxin is quite logically administered till cultures can substantiate this diagnosis. By this time, however, with the laryngeal obstruction becoming more distressing as manifested by increasing dyspnea with substernal and suprasternal retraction, the physician wisely decides on transfer to a hospital where the one and only procedure by which he can hope to establish a correct diagnosis is direct laryngoscopy. By this procedure, a foreign body can be ruled out or removed if present, diphtheria can be diagnosed and its membrane eradicated by suction or forceps, or the obstructive crusts attached to the cords or glottic wall in the disease we are discussing can likewise be removed. These crusts, composed of dried secretion, can be seen as soon as the larynx is exposed to direct view. There is no bleeding on removal, and they have none of the other characteristics of true diphtheritic membrane. The supraglottic tissues, arytenoids and false cords usually show relatively little reaction of an inflammatory nature in contradistinction to the picture of laryngeal edema or a true streptococcus laryngitis. The dry crusts will likewise usually be found loosely attached to the walls of the subglottic tissues, from which they can be removed mechanically. Below this point the tracheal secretions are usually fluid in character and tend at first to remain so till coming in contact with the air in the region of the larynx they become dried and hence transformed into obstructive crusts.

Once these crusts have been removed from the larynx, there is a restoration of a free airway, the patient's condition greatly improves, signs of urgent dyspnea disappear and one is tempted to think that no further difficulty will arise. If in addition an intubation tube is inserted by direct vision into the larynx, an open airway is still further assured. Certain milder types of this infection will require no further treatment beyond close observation in event that the intubation tube is coughed up, and the forced administration of fluids by hypodermoclysis, since with an intubation tube in place many children refuse absolutely to take fluids by mouth. It is impossible to stress too strongly the importance of maintaining a high fluid intake, since only by this means can one combat the further tendency in these patients for the tracheal secretions to become dried out and hence to produce further obstruction. No amount of the usual expectorant medications will take the place of this forced fluid administration since expectorants will fail unless ample body fluids are present for excretion into the trachea.

A certain group of these patients, however, will prove to be only temporarily relieved by intubation. Comfortable for a few hours only, these patients show all the original signs of the return of respiratory obstruction with the agonizing restlessness, thrashing about and tendency toward cyanosis. Temperature rises rapidly, pulse rate advances to an average of 150 and the respiratory rate is close to 55 or 60. We have now the typical picture of a full-blown case of fulminating tracheobronchitis.

On first consideration one might feel that the site of this recurrence of obstruction again lies in the larynx and that the intubation tube, having become occluded, is no longer providing an adequate airway. Such, however, has not proved to be the case, since on removal the tube will be found patent with an ample lumen. Likewise, if performed at the outset instead of intubation or if done on discovery that intubation is inadequate, tracheotomy will meet with little greater success, since either procedure accomplishes only the same thing—relief of laryngeal obstruction. The fundamental fact is this — that the obstruction, due to accumulated dried and crusted secretions, is now lower down, in the region of the lower trachea, tracheal bifurcation and primary bronchi, at which point no means designed to relieve laryngeal obstruction will be of the slightest avail. One procedure, and only one can be utilized in this urgent situation and that is bronchoscopy with mechanical removal of the obstructing masses by suction or by forceps. Failing this, the bronchial lumen on one or both sides will rapidly become obliterated, air will be unable to reach the periphery of the lungs, steady asphyxiation will ensue in spite of everything that can be done, and the patient will die a death of suffocation, than which there is no more ghastly clinical spectacle.

Tracheotomy has, however, a secondary value in the event that matters reach the degree just described. Since a single bronchoscopy will never be sufficient in treating these cases, owing to the tendency for the crusts to reform and reaccumulate, repeated bronchoscopies can be greatly facilitated by performing them through a tracheotomic fistula of sufficient size to permit an easy introduction and passage of the bronchoscope. Were there repeated operations to be carried out through the larynx, the latter would in a very short time so react to the passage of the bronchoscope as to necessitate a tracheotomy for laryngeal obstruction alone. Moreover, a tracheotomic bronchoscopy is less distressing to the patient and simpler for the operator than when done through the larynx. Needless to say,

no anesthesia is required or desirable in the face of such acute pulmonary infection.

From the moment when it becomes evident that by means of bronchoscopy an open airway can at least temporarily be maintained beyond the point at which inspissated crusts tend to accumulate, there begins a desperate struggle to maintain and enhance the patient's resistance sufficiently to enable him to combat the infection. In far the greater percentage of our patients who developed this fulminating type of infection, this was found to be impossible. Most of them lived only a few days; the infection spread rapidly downward; temperature, pulse and respiration rates all rose rapidly, and death ensued in spite of all measures employed. The use of an oxygen tent under such circumstances has proved useless and only large doses of morphine have been able to alleviate the sufferings of both the patient and parents.

In the rare instance where success has finally been achieved and the patient has been carried along by repeated bronchoscopies and by the most vigorous efforts to maintain a high fluid intake by means of fluids by mouth, intravenous injections and hypodermoclyses, it has proved to be a most prolonged and tedious procedure. The temperature, pulse and respiration rate have remained elevated for many days and only receded in a slow and gradual fashion. Periods would occur in which the patient was improved and apparently on the road to recovery, when out of a clear sky, and with no warning, bronchial occlusion would suddenly take place with a return of the typical dyspnea, again necessitating bronchoscopy. In the interim, repeated suction through the tracheal cannula with a catheter was necessary to remove the profuse purulent secretions produced within the tracheobronchial tree. Postmortem examinations of sections of the bronchi have shown that these purulent secretions are associated with a most profound change in the mucosa and submucosal tissue of the bronchi themselves. There is an intrinsic epithelial swelling with superficial necrosis of the surface, to such an extent that the normal bronchial lumen is tremendously reduced and in itself contributes greatly to the occlusion occasioned by accumulated secretions. It is the combination of these two factors which so extensively cuts down the available airway and produces the anoxemia which is so rapidly fatal.

X-rays taken at the onset of this condition do not show much pathology other than some increase in the peribronchial markings. As the disease progresses, films show a diffuse peribronchitis with a wide distribution and simulating miliary tuberculosis. There is no frank consolidation such as obtains in lobar pneumonia but such extensive involvement may result in a condition equivalent to a generalized bronchopneumonia.

From a bacteriological standpoint, smears and cultures from the tracheal secretions and dried crusts obtained by aspiration often show a gram positive diplococcus, morphologically similar to the pneumococcus, or else a typical staphylococcus. Cultures of deeper exudate uniformly show streptococcus hemolyticus, and from a pathological standpoint, the tissue changes seen in the lungs and upper respiratory track are quite typical of a streptococcus infection.

The question arises as to whether there are any specific therapeutic measures which might be of use in combating this violent infection. Anti-streptococcus serum has been tried on too few occasions to warrant positive conclusions and the same is to be said of staphylococcus bacteriophage. Transfusions are of only doubtful help and in the last analysis one must fall back on the two great clinical procedures discussed above, first and foremost the maintenance of a clear airway at all times and secondly, the introduction of the maximum amount of fluid which the patient can tolerate. Unless there be some specific antitoxin or serum for these infections, we must rely on the hope that thus supported, the patient's resistance will be a little greater than the virulence of the infective organism.

To date none of these truly fulminating cases have recovered. Most of them have survived only a few days at most—one only lived for 57 days, dying suddenly when apparently well on the road to recovery. Should future cases survive even beyond this limit and to the point of no longer needing to be hospitalized, one wonders what deep-seated pathological changes may still lurk in the lung tissue, to manifest themselves gradually either as multiple abscesses or as bronchiectatic cavities, condemning their victims to a life of semi-invalidism for years to come.

In our limited experience with these cases the question "Can Fulminating Tracheobronchitis be Cured?" remains as yet unanswered.

Discussion

Chairman Wyman: The discussion of Dr. Richards' paper will be opened by Dr. D. Campbell Smyth.

Dr. D. Campbell Smyth, Boston: I enjoyed Dr. Richards' dramatic moving picture very much. It is almost worthy of Dr. Jackson.

It was unfortunate that he should have lost this very sick patient on the fifty-seventh day when it seemed well on the road to recovery. He has given us a very interesting and concise summary on a subject about which little or nothing is known, and therefore has left practically nothing to add. Being connected with the Children's Hospital, he probably sees more of those cases than I do and I am glad of it. In the last few years we have had the same results with the fulminating type of tracheobronchitis. They have

all died. The futility of treatment of the condition, the symptoms and signs of which have been well described by Dr. Richards, would almost lead one to suspect that we are dealing with an overwhelming condition, with the pulmonary condition simply a local manifestation.

There is one unfortunate thing and that is that the bacteriology of this disease has not been worked out satisfactorily. Dr. Richards states that cultures from the bronchi in his cases showed streptococcus organisms, but that the predominant organisms found were pneumococci and staphylococci.

In reading the literature we find reports of cases showing pure cultures of streptococcus and other writers report a case of pure culture of staphylococcus albus, etc. It is essential that more work be done to determine the exact organism which causes this very severe and fatal condition.

I think, as Dr. Richards said, our future successful treatment, if we are going to have any, lies in determining the organism and using the serums, vaccines, or bacteriophages as indicated by the organisms present.

Now a word about tracheotomy. Tracheotomy should never be an operation of necessity. It should be one of election. Children will not react to a late tracheotomy, due to the fact that if it has been delayed too long the vitality has been too much lowered. I do not say that at the present time these can be saved, because none of us has had enough experience to settle the question, but early tracheotomy is of the utmost importance.

This is exemplified by a type of condition which comes nearer to simulating acute fulminating bronchitis than any other, viz., a child with a vegetable foreign body in the lung, as for example a bean. It is not an uncommon experience for us to have a baby sent in from a neighboring state accompanied by a letter from a doctor stating that the child has inhaled a bean and that an attempt has been made to remove it but was unsuccessful, that the bean was grasped a number of times but slipped away from the forceps. When the child arrives at the hospital it is desperately ill. It usually shows marked dyspnea and cyanosis, marked prostration, and a temperature ranging from 103° to 105°. In such a case no attempt is made to remove the foreign body. Instead, to preserve the child's margin of safety as much as possible, an immediate tracheotomy is done. Having done the tracheotomy it may be our good fortune to have the foreign body shoot through the opening. If it does not it is left alone. The tracheotomy tube is put in place and the child is put to bed with a house officer in constant attendance to take care of any emergency in case the foreign body comes up. Such a child goes through a very stormy period of from 4 to 7 days and suddenly coughs the bean up and usually gets well. Practically all such cases would be lost, if further attempts were made to remove the foreign body. In other words, early tracheotomy conserves the child's strength as much as possible.

I was disappointed to hear Dr. Richards' report of four cases getting well by intubation, because he started out to tell us about one particular condition, namely, acute fulminating bronchitis, and I hoped we would all talk about the same thing. I really believe, and I think Dr. Richards believes, that he was dealing with a much less severe condition in those four cases.

I regard intubation as contraindicated in the fulminating type as also I regard repeated bronchoscopies, except through the tracheotomy wound because, as Dr. Richards says, subglottic edema will develop after a few bronchoscopies and a tracheotomy will be required on account of laryngeal obstruction. Therefore, once the condition is diagnosed and recognized a tracheotomy should be done early before any cyanosis develops if the child's greatest margin of safety is to be preserved. I believe most of those children die of either multiple atelectasis, due to the closing off of the smaller bronchioles, or of myocardial failure.

My feeling is that all those cases should have antitoxin. Three or four negative smears do not necessarily remove diphtheria from consideration and I think it is safer to give it to them.

Transfusions should be held in reserve and, when we are going to have transfusions, I think it is well to get the oldest donor we can in order to get as many antibodies as possible in the blood.

Our treatment has been about the same as Dr. Richards' and so far I have to report the same results.

CHAIRMAN WYMAN: Dr. Richards' paper is now open for discussion.

DR. SIDNEY FARBER, Boston: I would like to make a point of the etiology of this disease, because it is not quite so confused as it appears. This disease is caused by streptococcus hemolyticus and that organism can always be obtained when deep cultures are made. It is not unusual to obtain the pneumococcus or staphylococcus from superficial cultures from the trachea since those organisms are usually present. The pathological changes in this disease are those of an uncomplicated descending streptococcus hemolyticus infection of the upper respiratory tract.

DR. EDWIN H. PLACE: I appreciate this presentation, I enjoyed seeing the picture and I am very sorry that such wonderful work was finally lost, particularly as the reason for the failure is not known. I would consider from the facts that Dr. Richards has given, that he really did cure one of these cases.

We have much the same results with the ful-

minating type, and if you ask whether it can be cured I will say that with this type it cannot be. The milder cases can be cured by the methods he has used. In older children and in adults, even in quite old adults, you will find, once in a while, a tracheal obstruction of this progressive type, involving the whole trachea and usually not the bronchi, with this very peculiar secretion, as Dr. Richards described it, like glue, which sticks to your instruments so that you cannot get it off. You have to rid them of it by washing and it will stick to any instrument that you put down the trachea.

These older patients are not fulminating; they have an obstruction just as these younger children do, but they are very easily relieved and they always get well in our clinic. The first one I saw was a girl not more than twenty-two years old. She had a secretion of this type below the larynx and almost complete dyspnea. When this was removed, she had immediate relief. The crust recurred and when it was removed there was no further trouble. In some cases the crusts extended from the larynx down through the trachea and into the bronchi, from which relief was readily secured mechanically and in which there was no overwhelming infection such as occurred in the children. Those cases always get well.

In the older cases, in addition to the treatment Dr. Richards used, we found a great deal of relief by swabbing the trachea with oil preparations. We used oil of sweet almonds with a small amount of menthol and eucalyptol. After you have removed the crusts, if you swab the trachea, it tends to prevent the forming of the crusts and alleviates the coughing, and it has proved of great value.

I think the point you made, Dr. Richards, of causing trauma is important. You have to remove the obstruction to the breathing or the patient will die, and in doing so, no matter how skillfully, it adds to the damage and possibly is a cause of infection. I know of no other way of getting rid of the obstruction except mechanically.

Dr. Josiah Quincy, West Roxbury: I want to congratulate Dr. Richards on the immense amount of work required in this case. A ruptured appendix is really nothing compared with the emergency encountered in these cases. It means that any time, night or day, you may be called in to remove these mechanically obstructing crusts. I want to congratulate Dr. Richards on the case which he presented, and which he presumably had cured. These cases previously have not had a chance of recovery. I am very sorry he lost this one.

Report of the Nominating Committee

The Chairman during the session appointed the following Nominating Committee: Dr. Barron, Dr. Percy, Dr. Baty.

The Committee retired and returned with the following nominations:

For Chairman, Dr. Edward S. O'Keefe, of Lynn.

For Secretary, Dr. Joseph Garland, of Boston.

Upon motion duly made and seconded, it was

Voted to accept said report and instruct the Secretary to cast one ballot for said nominees.

The Secretary having cast a ballot as directed, the Chairman declared Drs. O'Keefe and Garland elected to their respective offices for the ensuing year.

Adjourned.

NEW ENGLAND SURGICAL SOCIETY

ACUTE INTRASPINAL EPIDURAL ABSCESS*

BY WILLIAM JASON MIXTER, M.D.,† AND REGINALD H. SMITHWICK, M.D.†

THE subject of intraspinal epidural abscess, also called suppurative perimeningitis or peripachymeningitis, is an interesting one and, notwithstanding the comparative rarity of the disease, an important one. Such abscesses have been recognized for a good many years, one of the earliest reports of the disease being made by Traube in 1871. In many instances they have been discovered at autopsy. The progress of the disease is rapid and the prognosis very grave. These alone would make such a case a serious problem, aside from the fact that the diagnosis is seldom made until fairly late in the disease.

Taken all together the inflammatory lesions of the epidural space make up quite a group of cases, particularly if we include tuberculosis and the epidural granulomata of pyogenic origin. The granulomata are closely akin to abscess but the result of subacute or chronic infection and our cases have been reported recently in another paper[1]. Probably the majority of epidural abscesses are of neighborhood origin being secondary to osteomyelitis of the vertebral column, but there is a slightly smaller group where there is no bone involvement demonstrable. This latter group is the most interesting and cases falling into it may form a difficult diagnostic problem.

The infectious agent is most often staphylococcus aureus, though staphylococcus albus and other organisms may occasionally be found. The infection is borne in the blood stream and is frequently secondary to furunculosis, boils, carbuncles, or other superficial infections. Another common cause is infection of the nasal sinuses while in a third group no original focus can be demonstrated.

The abscess itself is peculiar in that it almost invariably lies posterior to the cord except where it is secondary to disease of the vertebral bodies. This is due to the fact that the dorsal epidural space is loose and open whereas the ventral dura is firmly adherent to the vertebral bodies. Owing to the loose meshwork of tissue in the dorsal epidural space the abscess spreads up and down with great rapidity. In our most recent case it extended from the fourth cervical vertebra to the sacrum. In two of our cases, the abscess was situated anterior to the dura, and in both of these there was an associated osteomyelitis of the vertebral bodies. In both cases the abscess perforated the dura, resulting in a secondary acute meningitis. This should be emphasized, because in the other eight cases with abscess cavities in the dorsal epidural space, secondary meningitis did not occur. It is apparently more difficult for an anteriorly situated abscess to spread up and down the anterior epidural space than to penetrate the subarachnoid space. Of four cases with associated infection of the vertebrae, the abscess cavity was located anterior to the dura in two. Hence, early recognition and drainage of epidural abscess secondary to osteomyelitis of vertebrae is particularly important because the abscess is very apt to be situated anteriorly and be complicated by meningitis.

Of course the spinal subarachnoid space and the spinal cord are compressed by such an abscess but the extent and severity of the myelitis caused is out of all proportion to the amount of compression. Hassin demonstrated this in a case which he reported in 1928[2]. It had also been noted by Ayer and Viets[3]. When exposed at autopsy these cords are not badly compressed but on section they show marked softening. The dura is very resistant to infection and is seldom perforated which makes this extreme softening difficult of explanation. Hassin believes that substances from the epidural space may travel in along the spinal roots and we believe that his theory is sound. We know that infections may travel in the peripheral nerves at times and we also know that in tetanus the toxins may travel upward to the cord in almost unbelievable fashion.

The material which has caused us to make this communication is as follows:

Five cases of acute metastatic epidural abscess operated on by us—the first of which has already been reported by one of us[4]—and five cases of acute epidural abscess associated with adjacent osteomyelitis. Operation was performed in two of these cases, the other three being moribund when seen. One of the unoperated cases has already been reported by Ayer and Viets[3] and is included in this series with their permission.

Five of these cases were seen in private practice and five are from the records of the Massachusetts General Hospital. Thus we have ten cases from which we may make certain generalizations. A brief summary of the cases is given in Table I.

*Read at the Annual Meeting of the New England Surgical Society, Portland, Maine, September 11, 1931.

From the Surgical Services, Massachusetts General Hospital, Boston, Massachusetts.

†Mixter—Visiting Surgeon, Massachusetts General Hospital. Smithwick—Assistant Surgeon to Outpatients, Massachusetts General Hospital. For records and addresses of authors see "This Week's Issue," page 151.

TABLE I

Case	Sex and Age	Duration of Symptoms	Probable Primary Focus	Site of Abscess	Osteomyelitis of Vertebra	Meningitis	Organism	Operation	Result
1.	M. 43	3 wks.	Breast abscess	Posterior to dura	Yes (rib)	No	Staph. albus	No	Died
2.	M. 17	16 dys.	Furunculosis face	"	No	No	"	Yes	"
3.	M. 34	3½ wks.	Mastoiditis	Anterior to dura	Yes	Yes	"	No	"
4.	M. 41	4 wks.	Periesophageal abscess	"	Yes	Yes	"	Yes	"
5.	M. 36	6 wks.	Unknown	Posterior to dura	Yes	No	Staph. aureus	Yes	"
6.	F. 14	5 dys.	Septic toe	"	No	No	"	Yes	Complete recovery
7.	F. 17	2 wks.	Furunculosis face	"	No	No	No growth	Yes	Complete recovery
8.	M. 16	10 dys.	Unknown	"	No	No	Staph. aureus	Yes	Died
9.	M. 27	—	Unknown	"	Yes	No	"	Yes	"
10.	M. 17	3 wks.	Septic blister	"	No	No	Staph. aureus	Yes	Survived with residual palsy

A detailed description of the cases follows:

CASE 1. Male, aged 43.

This case is a patient of Doctors Ayer and Viets and is reported with their permission[3].

Abscess of right breast following a nail scratch, duration two weeks. Seven days later pleurisy pains in lower back with temperature of 102-104°. Two weeks later unable to void and pain in legs, followed rapidly by paralysis and incontinence of urine and feces. Lumbar puncture, 4 c.c. of yellow clear fluid, no pressure, coagulates on standing, 1 cell, proteids three plus, sterile. Negative Wassermann.

Autopsy seven days later showed an area of granulation tissue 10 cms. about right nipple. Necrotic paravertebral lymph glands were present at about fifth dorsal level, there was free pus in the muscles of back which had extended inside the spinal canal where there was an epidural abscess underlying the fifth, sixth and seventh laminae, 10 cms. in extent. Culture: staphylococcus albus. Autopsy showed changes in the cord on microscopic section, most noticeable in white matter.

CASE 2. Male, aged 17. H. Private File No. 1,574. February, 1916.

This case referred by Dr. Shaw of Newburyport.

Marked furunculosis of the face. Pain in left shoulder, and left side of chest, level of fifth rib, of sixteen days' duration. Worse on respiration. Sore throat. Retention of urine of five days' duration and stiffness of legs of four days' duration. Headache and stiff neck followed shortly by spastic paraplegia. Temperature 105°, white blood count 30,000, pulse 118. Zone of hyperesthesia, seventh to ninth dorsal with complete anesthesia and paralysis below this level. Lumbar puncture, clear, slightly yellow fluid, normal pressure, coagulates on standing. Rare cell, proteids three plus.

Operation: Laminectomy, third to sixth dorsal. Abscess cavity, epidural, running from third dorsal to first lumbar, containing creamy pus. Rubber tissue drain. Culture: staphylococcus albus. Death a few hours later. No autopsy allowed.

CASE 3. Male, aged 34. J. S. Mass. Gen. Hosp. No. 281,221. December, 1930.

Pain in left shoulder and back and stiffness of neck of three and a half weeks' duration. Five days before onset of pain he had had a right simple mastoid operation under ether anesthesia. Several days after onset of the pain in right shoulder, a similar pain appeared in left shoulder. For ten days the patient has been unable to move his left arm although the hand is not anesthetic.

Physical examination was not remarkable except for local tenderness over upper dorsal spine and inability of patient to move his left arm. Passive movement of the left arm was very painful which may in part explain the lack of voluntary motion. Reflexes negative. Temperature 99 degrees by mouth. White blood count 16,000. Urine normal. X-ray of the spine showed a marked deformity of the sixth dorsal vertebra. Lumbar puncture showed the cerebrospinal fluid to be slightly yellow and turbid. Initial pressure 545. Slow rise and fall on jugular compression. After withdrawal of 5 c.c. the pressure fell to 385; after 10 c.c., pressure 0. Cells—r.b.c. 23, w.b.c. 2250, 90% polymorphonuclear leucocytes. Total protein 1200. Culture: staphylococcus albus.

Two days after admission the patient became unconscious, temperature rose to 104 degrees by rectum and he died three days after admission.

Autopsy showed acute osteomyelitis of sixth dorsal vertebra, intraspinal epidural abscess with perforation of dura and secondary acute cerebrospinal meningitis.

CASE 4. Male, aged 41. J. L. Mass. Gen. Hosp. No. 306,797.

Substernal pain and difficulty in swallowing. This followed shortly after a meal. He went to his family physician who passed a large tube down into his stomach. This was followed by partial relief for a few hours. The symptoms increased until six days later when an incision was made in left side of neck and an abscess containing three ounces of foul pus was evacuated. This abscess was anterior to the spinal column at the level of sixth cervical vertebra. It was presumably due to perforation of the esophagus by a foreign body.

Four weeks later, while the wound in neck was still draining pain appeared back of the incision in

the region of the fourth dorsal vertebra and radiated down both arms. This gradually increased in severity and, about two months after the original injury to the esophagus, the patient entered the hospital for study.

He ran a low-grade temperature and blood count for one week after entry. X-rays revealed a mass at the level of the sixth cervical vertebra displacing the trachea forward. No abnormality of the vertebrae themselves was visible, but osteomyelitis of the cervical spine was presumed. No localizing neurological signs appeared until ten days after entry. Lumbar punctures on the seventh and eighth days after entry showed a slightly cloudy fluid with normal dynamics, five to fifteen thousand white blood cells, 80%-90% polymorphonuclears, total protein of about 500. No growth from cultures.

On the tenth day after entry, a complete block developed. Cell count of spinal fluid remained about the same, protein (total) rose to 708. The patient's temperature rose to 104° by rectum and white blood count to 20,000.

There was slight blurring of the optic discs and a marked Kernig's sign on both sides. No sensory level, no paralysis. Reflexes in the upper extremities were present and sluggish, in lower extremities equal and lively.

Exploratory laminectomy from fifth cervical to second dorsal vertebrae with extradural exploration of spinal canal revealed nothing abnormal.

He died three days later and an autopsy revealed a perforation of the esophagus, periesophageal abscess, osteomyelitis of the cervical vertebrae with extension to the dura and epidural space anteriorly and through the dura to cerebrospinal space with purulent meningitis and myelitis. Culture: staphylococcus albus.

Case 5. Male, aged 36. A. K. Mass. Gen. Hosp. No. 278,144. August, 1926.

Pain under left costal margin of six weeks' duration, followed in a day by pain under right costal margin. This was followed by pain in back between the shoulders, quite severe and constant, of one month's duration. This was suddenly followed by paralysis of the legs associated with anesthesia to level of the hips. This level rose rapidly in a few hours to the nipple line. Physical examination showed marked jaundice. Tenderness over dorsal spine. One decayed tooth.

X-ray of the fourth and fifth dorsal vertebrae indistinct. There was a soft tissue shadow to right of spine extending from the second to sixth dorsal. White blood count 16,650. Icteric index 50. Urine—bile two plus. Blood culture—staphylococcus aureus. Spinal fluid, clear, yellow, initial pressure 50 m.m. No rise on jugular compression. Cells 12 (lymphocytes) Ammonium sulphate+. Alcohol ++.

Operation: Laminectomy, third and fourth dorsal. Pus in muscles of back and in epidural space. Dakin's tubes placed. Wound closed loosely. Culture: staphylococcus aureus.

Patient died in 48 hours.

Autopsy showed osteomyelitis of fifth dorsal vertebra, dural abscess, compression, purulent infiltration of the muscles of back with extension into the right pleural cavity, myelitis, septicemia (staphylococcus aureus), acute pericarditis, acute and chronic pleuritis.

Case 6. Female, aged 14. E. M. Mass. Gen. Hosp. No. 307,480. July, 1930.

Three weeks ago the patient cut her right first toe on a rock on the beach. The toe became sore and tender and the wound did not heal for about twelve days. Six days ago she felt feverish, ill, and developed a slight cough. Five days ago, pain in upper portion of back, no radiation. Temperature 104 degrees. For past two days her neck has been sore and stiff, she has been unable to void and bowels were very costive. Today her legs are very weak and she is unable to stand.

Positive physical findings: Marked weakness of muscles of right thigh, loss of reflexes of that leg and disturbance of bladder and rectal function as well as some stiffness of neck, rigidity of spine, hyperesthesia of mid-dorsal spine and bilateral Kernig. Temperature 102.6° by rectum. Pulse 176. Respirations 30. White blood count 16,000. Urine negative. Tap in third lumbar space; bloody pus obtained before reaching dura. Operation: Laminectomy seventh to tenth dorsal. Much pus in muscles of the back outside of the laminae on both sides. The spinous processes were removed. The epidural fat was hard and tense with small droplets of pus exuding from it. Fat was opened and an abscess cavity running up and down within the spinal canal and compressing the dura was found. Dura involved only by compression. Catheter passed upward two inches above limits of laminectomy and four inches below, and left in place. Muscles closed loosely and skin with silk. Culture: staphylococcus aureus. Patient made a stormy but complete recovery and is well without symptoms twenty-one months after operation.

Case 7. Female, aged 17. D. O. Priv. File No. 9,408. August, 1930.

Case referred by Dr. F. F. Celce of Holyoke.

Pain in the back between the shoulder blades for two weeks. Otherwise well and healthy except for furuncles of face which are quite chronic. The pain was temporarily relieved by strapping her back with adhesive plaster but it recurred about ten days after onset. Patient was up and about until four days later when she awakened in the morning to find herself totally anesthetic from the nipple line down with motor paralysis over same area, retention of urine and incontinence of feces. She was seen by several doctors. Lumbar puncture revealed a clear fluid with a complete block.

She was seen by one of us, one week after the onset of anesthesia and paralysis, in consultation with Dr. Celce of Holyoke, Massachusetts. Examination revealed complete anesthesia from the twelfth dorsal level down, with motor paralysis and absent reflexes below this level. In this case the sensory level had moved from about the fourth dorsal to the twelfth dorsal during a week, presumably due to extension of the pus up and down the dorsal epidural space with partial relief of compression. A lumbar puncture showed a clear fluid under normal pressure with a partial block. Patient had a slight afternoon temperature, with slight elevation of white blood count.

Operation: A laminectomy was performed, and an abscess cavity lying under the laminae of third, fourth and fifth dorsal was exposed. It contained thick pus under tension. The dura was thickened but otherwise normal. The wound was closed loosely about rubber drains. Culture of the pus showed no growth. Guinea pig inoculation revealed no evidence of tuberculosis. She made an uneventful complete recovery and is well eighteen months after operation.

Case 8. Male, aged 16. J. S., Jr. Mass. Gen. Hosp. No. 310,761. December, 1930.

Moderately severe pain in lumbar back, of ten days' duration, slight headache, dizziness. Temperature 102°.

Eight days ago he was given osteopathic manipulation followed by increase of symptoms. Seen by

his family physician who found him standing, holding on to the back of a chair. He had a stiff neck and opisthotonos, partial foot drop, absent knee jerks, ankle jerk ++, Babinski ++, absent clonus, bilateral Kernig's sign present.

Seven days previously his temperature reached 103 degrees. Lumbar puncture was performed and 6 c.c. of clear fluid obtained. It contained 32 lymphocytes and the sugar was increased. He was given 60 c.c. convalescent poliomyelitis serum. He was taken to the Greenfield Hospital where a diagnosis of transverse myelitis was made. He was then transferred to the Massachusetts General Hospital.

A sensory level was demonstrated at the fourth lumbar level with paralysis of both legs. Ankle jerks absent, knee jerks and clonus absent. Positive Kernig's sign. Incontinence of urine and feces, stiff neck. There was a decubitus over the sacrum. One day before entrance he noticed numbness on the ulnar side of the right hand and forearm. He had had no recent infection of throat, abscess, furuncle, etc.

When seen by us his temperature was 104 by rectum, pulse 120, respirations 30. White blood count 16,350. Urine negative. There was anesthesia from the umbilicus down with a band of hyperesthesia four inches wide above. He showed motor paralysis with loss of reflexes below the umbilicus.

Operation: A laminectomy was done extending from the ninth dorsal to the second lumbar. An abscess cavity was opened running from the seventh dorsal to the second lumbar vertebra. The abscess was entirely posterior to the dura. A catheter was inserted into the abscess cavity and the wound closed loosely about a Miller wick. Culture: staphylococcus aureus.

He ran a septic temperature for three weeks after operation. There was no return of sensation or motor function and no increase in paralysis.

This patient developed large bed sores with mixed infection including B. Welchii, then a pyelitis, then bronchopneumonia and died two months after operation. No autopsy was allowed.

Case 9. Male, aged 27. J. M. Priv. File No. 9,619. January, 1931.

Patient seen in consultation with Dr. F. J. Cotton of Boston.

Osteomyelitis of the tibia twelve years ago. He has had numerous operations on the leg since that time and finally, several months ago, developed a metastatic abscess of the fourth rib on the right. This was operated on but the process extended, finally involving the vertebrae with evident compression of the spinal cord as shown by complete paralysis, motor and sensory, below that level. A laminectomy was performed by Dr. F. J. Cotton, the laminae of the fourth and fifth vertebrae being removed and a good-sized extra-dural intraspinal abscess found at this level. The laminae were definitely involved as were the bodies of the vertebrae. The wound was only partially closed and drainage was instituted.

Notwithstanding this operation the progress of the case was steadily downhill and he died some weeks after the laminectomy. Numerous cultures were taken from the various areas of osteomyelitis at different times and always showed staphylococcus aureus. At no time did he show any evidence of meningitis.

Case 10. Male, aged 17. T. C. Priv. File No. 9,871. July, 1931.

Patient seen in consultation with Dr. George Morse at the Brooks Hospital. Six weeks ago the patient developed a septic blister on the hand from rowing. This was followed shortly by a carbuncle of the face. Three weeks ago, pain developed in one flank and patient was put to bed with a tentative diagnosis of perinephric abscess. A definite swelling appeared in the lumbar region. Ten days ago a lumbar puncture was attempted and pus obtained before the canal was reached. Drainage of the abscess revealed pus beneath the deep muscles of back lying on laminae with extension between laminae to neural canal. Several days ago there was a gradual onset of paralysis, first the left leg, then the right leg and then bladder and rectum. A sensory level then appeared which rose rapidly to the second dorsal level. Temperature, pulse and respirations rose and his general condition became much worse.

Examination revealed a level of hyperesthesia at the second dorsal with numbness in fifth fingers of both hands, tenderness the entire length of spine and a stiff neck. There was complete absence of reflexes below the second dorsal with almost complete motor paralysis of both arms and legs.

Operation: Revealed an intraspinal epidural abscess posterior to cord, extending from the sacrum to the fifth cervical. A double laminectomy was performed, the upper being at the second dorsal to fourth dorsal inclusive, and the lower the third to the fifth lumbar inclusive. Dakin's tubes were passed up and down the epidural space between the two operative fields and left in place for drainage. Culture: staphylococcus aureus.

The patient made a slow, stormy convalescence which was complicated by a septic knee joint which was drained two weeks after the laminectomy by Dr. Morse.

The patient has now returned to his home. He reports that his condition is improving and that he is beginning to use his limbs. He still has a draining sinus in the lumbar region.

The onset of the disease is usually rapid but there is little to point to the correct diagnosis until the paralysis begins to appear. History, of course, is important as it may suggest the original focus of infection. This was so in seven of our cases. Such a history, however, is only suggestive for it is often met with in other lesions such as metastatic perinephritic abscess with which this disease may be easily confused. Malaise, pain in the back, neck and head, elevation of temperature and high white count may be the sum total of the early signs and symptoms. The next development is more localized pain in the back and neck with pain on motion and occasionally tenderness on percussion of the spine. Girdle pain may show itself next and finally weakness of and pain in the legs and difficulty of urination and defecation. Disturbance of sensation may also appear at this time. The one sign that is most suggestive of abscess if it is present, is a definitely rising level of girdle pain or of sensory disturbance associated with the foregoing picture. Such a rising level is most unusual in association with inflammatory disease except in acute ascending myelitis. The latter can usually be ruled out by the presence of symptoms referable to the vertebral column and roots, such as root pain, pain on motion and on percussion and apparent stiffness of the back and neck. Meningitis can be ruled out by the absence of evidence of real spasm of the neck and by the orderly progression of signs from below upward. It is frequently diffi-

cult to differentiate infantile paralysis from abscess but the presence or absence of sensory disturbance will usually tell the story. One must be careful, however, not to mistake the muscle tenderness of infantile paralysis for increased skin sensibility.

Roentgenological examination is of little or no value except in the cases where osteomyelitis has been present for some time. The use of lumbar puncture in this disease is open to question and if performed at all it should be done only with the greatest care. The danger of infecting a clean subarachnoid space by carrying pus into it with the needle must always be borne in mind. If lumbar puncture is performed it may well confirm a tentative diagnosis. Pus from the epidural space or evidence of block in the lumbar fluid are definite indications of epidural abscess.

There are no typical changes in the spinal fluid obtained by lumbar puncture in this disease. The color may be normal or yellow, or it may be cloudy or clear. There may be normal dynamics, a partial or a complete block. The cellular changes may be very slight or marked. The total protein is apt to be distinctly elevated even though the cell count may be within normal limits. One may at times have a complete block with a sterile fluid below, and a purulent meningitis above. This may be the case when the abscess is anterior to the dura. One may have a complete block and find a few days later that it has disappeared because the abscess has extended up and down the dorsal epidural space relieving the local spinal cord compression. Hence, lumbar puncture may be misleading at times, and distinctly dangerous, but if done carefully it furnishes valuable evidence when correlated with other findings.

Treatment consists in laminectomy and drainage. Three or four laminae should be removed somewhere near the middle of the supposed abscess cavity, though in rare instances it may be advisable to do a double laminectomy as was the case in patient No. 10 who had an abscess extending from the cervical region to the sacrum. We have found that small rubber catheters or Dakin's tubes make the best drains and believe that they should be run up and down within the spinal canal to the top and bottom of the abscess cavity. The operation is always a bloody one for the vessels of the spinal column and in the muscles of the back are markedly engorged as they are about any abscess cavity. A laminectomy is never a dry operation and in this disease the oozing of blood is little short of appalling. Pus is sometimes encountered in the muscles of the back from extension between the laminae or if not, there may be much edema of the connective tissue, between the muscles. When the laminae are removed the epidural fat is hard and red and bleeds at the slightest touch. At the first attempt to strip the fat away from the dura, the abscess cavity is opened and thick pus under pressure wells out. Occasionally the process shows some of the characteristics of epidural granuloma in that the epidural fat is hard and porky and encloses multiple smaller abscesses. Such a process is much more circumscribed than the single frank abscess.

The mortality of this disease is high. Of our ten cases the total mortality was 70%. All of the unoperated cases—three in number—died. Of the seven operated cases, three have survived. One, No. 6, a very early case in which the abscess had risen only to the ninth dorsal level, is living and well with no residual palsies twenty-one months after operation. The second, No. 7, a case with an abscess of moderate size in the upper dorsal region, is living and well without symptoms, eighteen months after operation. The third, No. 10, a boy with a very large abscess, is living nine months after operation. He still shows extensive paralysis and has a draining sinus in the lumbar region.

In conclusion we wish to emphasize certain points. This disease is a definite clinical entity and is common enough to warrant watching for it.

It is a serious disease with high mortality if left untreated.

The abscess is most frequently found posteriorly situated. If anterior, meningitis is a frequent complication.

The infectious agent most frequently found is staphylococcus aureus or albus.

Such an abscess may be secondary to almost any acute infection or to osteomyelitis of neighboring bones.

The damage to the spinal cord may be out of all proportion to the amount of compression.

If lumbar puncture is performed it should be done with the greatest possible caution.

The diagnosis is difficult at times, particularly in the early stages, but it is only by recognizing it early and instituting drainage that we can hope to save any of these patients.

No attempt has been made to review the literature of this subject.

REFERENCES

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Discussion

Dr. Robert Osgood, Boston, Mass.: I should like to open the discussion by saying I know nothing about the condition at all, Mr. President. I am sorry.

Dr. F. B. Lund, Boston, Mass.: A man of about fifty had a son of about twenty with whom he had a wrestling match and the son threw the father and it was two days before I saw him. I was called to see him about seven o'clock on Saturday evening and was going to New York that night. He had a temperature of over 102°, an awful pain in the back of his neck, and pain and stiffness of the muscles and paralysis. I told him to get a neurologist and I took the train to New York and they got the late Dr. Joseph Courtney. On Monday night when I got back, the man was dead. We had an autopsy and opened the lamina and pus came out, and that pus extended at least five or six inches each way. I don't know what that man had in the way of history of previous infection, but that was certainly one of these cases such as Dr. Mixter has described, and I think he is to be congratulated on having seen and recognized them, because they are difficult.

Another case came under my observation. This was a man who had an operation of the tibia for osteomyelitis in his youth. I don't believe it belongs to this classification exactly, but it is related to it. He got over that and had a large carbuncle on the back of his neck, of which an extensive scar was in evidence when he came to me. He consulted me for varicose veins, and I am ashamed to say that I didn't discover anything but the varicose veins. I operated on them followed by healing.

I noticed afterward when he came into the office that he had spasm of both legs and could hardly walk, and he said my operation hadn't done any good, and it didn't seem to me that it had. I sent him to Dr. E. W. Taylor, the neurologist, and he made a diagnosis of a possible tumor of the upper dorsal cord. I performed a laminectomy and found the dura thick and adherent to the cord, so when it was split open no spinal fluid escaped. Under those circumstances I thought I wouldn't sew it together and left it open. The pressure on the cord from which he was evidently suffering was relieved. The operation consisted in the removal of the lower cervical and two upper dorsal laminae, leaving a wide opening of two or three inches in length. He got well and was well for several years. Lately he returned with a little more spasm, but it didn't seem very serious. I wondered whether the thickening of the dura was an old infection which was in some way connected with his carbuncle.

Dr. H. Bertram Lambert, Bridgeport, Conn.: May I ask if the use of a sacral puncture needle might aid early diagnosis of these cases and if the use of sacral anesthesia might not be a source or cause of infection?

Dr. W. J. Mixter: Dr. Lambert, I doubt if sacral anesthesia causes this thing very often. Of course, there have been two or three accidents with sacral anesthesia, but I think they have been usually from puncture of the meninges and resulted in meningitis.

In some of these cases the infection runs well down into the sacrum and I should be a little bit afraid of even a sacral puncture where the symptomatology would lead one to think that it was well up in the dorsal region. I think the lumbar puncture is safe there in the face of a positive Babinski's sign, but I leave lumbar puncture out of the case as a rule.

It might be of interest to state that the first six or seven cases we operated on were found by accident in simply operating for some unknown inflammatory condition of the spinal meninges.

The last four cases have been at least tentatively correctly diagnosed before operation. One was an accidental finding of the house officer who did a lumbar puncture and got pure pus, without getting the needle through into the right space, for which I was thankful. The others were properly diagnosed without the use of lumbar puncture.

In one case we made a diagnosis of abscess and the lumbar puncture was performed and there was no abscess. The patient died apparently of ascending myelitis, and lumbar puncture would have been good in that case as ruling out a bad operation.

Dr. Lund has brought up a very interesting point, the question of trauma. In the cases of frank abscess we have not met with trauma as a cause or as a contributing cause, but in the cases of epidural granuloma, which are, of course, very closely akin, several times we have met with trauma as a contributing cause. Usually we have trauma a week or two before the lesion shows itself frankly.

I should think that probably the other case you spoke of would represent a chronic pachymeningitis.

cult to differentiate infantile paralysis from abscess but the presence or absence of sensory disturbance will usually tell the story. One must be careful, however, not to mistake the muscle tenderness of infantile paralysis for increased skin sensibility.

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Dr. F. B. Lund, Boston, Mass.: A man of about fifty had a son of about twenty with whom he had a wrestling match and the son threw the father and it was two days before I saw him. I was called to see him about seven o'clock on Saturday evening and was going to New York that night. He had a temperature of over 102°, an awful pain in the back of his neck, and pain and stiffness of the muscles and paralysis. I told him to get a neurologist and I took the train to New York and they got the late Dr. Joseph Courtney. On Monday night when I got back, the man was dead. We had an autopsy and opened the lamina and pus came out, and that pus extended at least five or six inches each way. I don't know what that man had in the way of history of previous infection, but that was certainly one of these cases such as Dr. Mixter has described, and I think he is to be congratulated on having seen and recognized them, because they are difficult.

Another case came under my observation. This was a man who had an operation of the tibia for osteomyelitis in his youth. I don't believe it belongs to this classification exactly, but it is related to it. He got over that and had a large carbuncle on the back of his neck, of which an extensive scar was in evidence when he came to me. He consulted me for varicose veins, and I am ashamed to say that I didn't discover anything but the varicose veins. I operated on them followed by healing.

I noticed afterward when he came into the office that he had spasm of both legs and could hardly walk, and he said my operation hadn't done any good, and it didn't seem to me that it had. I sent him to Dr. E. W. Taylor, the neurologist, and he made a diagnosis of a possible tumor of the upper dorsal cord. I performed a laminectomy and found the dura thick and adherent to the cord, so when it was split open no spinal fluid escaped. Under those circumstances I thought I wouldn't sew it together and left it open. The pressure on the cord from which he was evidently suffering was relieved. The operation consisted in the removal of the lower cervical and two upper dorsal laminae, leaving a wide opening of two or three inches in length. He got well and was well for several years. Lately he returned with a little more spasm, but it didn't seem very serious. I wondered whether the thickening of the dura was an old infection which was in some way connected with his carbuncle.

Dr. H. Bertram Lambert, Bridgeport, Conn.: May I ask if the use of a sacral puncture needle might aid early diagnosis of these cases and if the use of sacral anesthesia might not be a source or cause of infection?

Dr. W. J. Mixter: Dr. Lambert, I doubt if sacral anesthesia causes this thing very often. Of course, there have been two or three accidents with sacral anesthesia, but I think they have been usually from puncture of the meninges and resulted in meningitis.

In some of these cases the infection runs well down into the sacrum and I should be a little bit afraid of even a sacral puncture where the symptomatology would lead one to think that it was well up in the dorsal region. I think the lumbar puncture is safe there in the face of a positive Babinski's sign, but I leave lumbar puncture out of the case as a rule.

It might be of interest to state that the first six or seven cases we operated on were found by accident in simply operating for some unknown inflammatory condition of the spinal meninges.

The last four cases have been at least tentatively correctly diagnosed before operation. One was an accidental finding of the house officer who did a lumbar puncture and got pure pus, without getting the needle through into the right space, for which I was thankful. The others were properly diagnosed without the use of lumbar puncture.

In one case we made a diagnosis of abscess and the lumbar puncture was performed and there was no abscess. The patient died apparently of ascending myelitis, and lumbar puncture would have been good in that case as ruling out a bad operation.

Dr. Lund has brought up a very interesting point, the question of trauma. In the cases of frank abscess we have not met with trauma as a cause or as a contributing cause, but in the cases of epidural granuloma, which are, of course, very closely akin, several times we have met with trauma as a contributing cause. Usually we have trauma a week or two before the lesion shows itself frankly.

I should think that probably the other case you spoke of would represent a chronic pachymeningitis.

THE NEISSERIAN MEDICAL SOCIETY OF MASSACHUSETTS

ADDRESS*

BY EDWARD T. DEVINE, PH.D.†

AGAIN the faith which we are told to have in Massachusetts is justified. I speak not from the point of view of the filial loyalty of a native son; nor yet from that of a beaten enemy, like the Spaniards who praised Sir Richard Grenville to his face with their courtly Spanish grace after the battle of The One and The Fifty-three. With courtesy, I hope, with a neighbor's hearty coöperation and good-will, with a fellow-American's admiration for your courage and your professional and humanitarian spirit, I come to extend my congratulations on the founding of The Neisserian Medical Society. Massachusetts! There she stands! Once more pioneering, once more reviving a fine old ideal in a new form, consonant with modern ideas, and with present knowledge of present needs.

I have been instructed not to discuss the medical or even the public health problems with which The Neisserian Society is to deal, but merely to feed your souls. That considerably cramps my style. It gives me no opportunity to plagiarize from the extensive browsing which I have done in the documents and publications of your State Health Department, the United States Public Service and elsewhere, since I accepted your invitation. It is not however, I trust, more than a technical violation of the regulation if I say that, of all the literature which I have thus cursorily examined, the most striking and significant appears to be the twelve-page memorandum on gonorrhea and syphilis in Massachusetts in 1930 by Drs. Nelson and Seaman of your State Department.

You get there, for the entire state, a base line from which one can proceed. In a year you have doubled the number of cases reported—over 11,000 in 1930, as compared with less than 6,000 in 1929. The reports received are said to contain nearly all of the information requested. You are, therefore, in position to make a really informative analysis. You can put your finger on weak spots. You know what physicians received arsenicals, but did not report syphilis. You know that less than one-third of the physicians who might have been expected to report one disease or the other actually did so. You have learned that patients go for treatment elsewhere than where they reside, and that neither the desire to consult specialists nor the desire for secrecy seems to explain this phenomenon; and you hit upon the excellent suggestion that we had better find out, if we can, whether patients migrate also for treatment of other diseases. You find other things which I have not failed to notice, although it might be presumptuous and even a clear violation of instructions to quote or comment upon them.

Will you permit me at this point, for reasons which I will explain later, to rely for a moment upon my prepared manuscript?

It is not unnatural that, in our efforts to diminish the amount of unnecessary disease, we have been aroused to action first in the case of those diseases which show a startling death-rate. We have been slow to recognize the importance of active measures against diseases that merely incapacitate even though they may destroy the earning capacity of their victims, wreck homes and happiness, and largely contribute to physical and mental deterioration. We are only beginning to see the folly of our indifferent and supine attitude toward malaria; we still refuse to treat "a cold" with any seriousness, though we know the frequent consequences of neglect. In regard to venereal diseases we have not only been negligent, but there has been so definitely a "conspiracy of silence" that the subject can hardly yet be mentioned outside of professional circles, except in advertisements, and "there is presented in this country the singular spectacle of a large class of diseases dangerous to the public health, confessedly contagious, essentially evitable, and yet absolutely ignored by our health authorities".

Ignorance as to the social significance of these diseases is responsible for our indifference. Mortality tables give scarcely the faintest hint of their importance.

Facts on these points must come from hospital figures and the experience of physicians. Physicians are beginning to feel their responsibility to give society the information which is the essential preliminary to securing measures for improvement. When the facts are known, it seems incredible that the mass of intelligent men and women have not been cognizant of them long ago.

Gonorrhea, we are told, is perhaps, in large towns, the most prevalent disease, next to measles; it is "the most important cause of depopulation", being responsible, by reason of its effect on the procreative function of both men and women, for a large majority, if not, as some authorities have estimated for fully three-fourths, of all sterile marriages; to the gonorrheal infection of the eyes of the newborn is attributed from twenty to thirty per cent of all blindness; in the institutions for the blind in Saxony the percentage was found to be seventy-five and in Switzerland, seventy-nine. Gonorrhea is responsible for much chronic ill-health and nervous derangement in women; it frequently brings on mental depression, which may be intensified into insanity, and is the real cause of many otherwise inexplicable suicides among men.

Beginnings of systematic effort are now being made. The initiative has been taken, as was appropriate, by the medical profession. But the medical profession cannot alone accomplish what is needed.

As must be expected in the early stages of a movement involving such great delicacy, some diversity of opinion exists in regard to the program to be

*At Boston, May 12, 1931.

†Devine—President of the United Neighborhood Houses of New York. Executive Director, Emergency Work Bureau, County of Nassau, Mineola, N. Y. For record and address of author see "This Week's Issue," page 151.

adopted, but a general outline on which there is substantial agreement has already taken shape. This program shows the influence of our experience with the tuberculosis problem. The main features, as now agreed upon, are the same as have been found necessary in dealing with tuberculosis: adequate provision for early diagnosis and treatment; the suppression of charlatanism; legislation in certain directions, if it can be made effective; and education about the causes and consequences of these diseases, by all appropriate existing agencies for such education, or by agencies created for the purpose, if existing ones prove unavailing.

The difference of opinion relates chiefly to methods: what sort of legislation can be made effective; how an early diagnosis can be secured and proper treatment insured; how the harm that is done by quacks can be stopped; and by what means the irreducible minimum of accurate information can be supplied to all boys and girls. At every step the task is infinitely more difficult than in the case of tuberculosis. Tuberculosis may not be a pleasant subject, but it is not one which generations of usage have prohibited to polite conversation; one may hesitate to admit that he is a consumptive, but not because he feels that by so doing he marks himself with an irremovable stigma. The difficulty of an undertaking has, however, never constituted a valid argument for abandoning it, when the necessity for it has been generally admitted. It is rather an additional stimulus to determined effort.

It seems clear that specific instruction in sexual physiology and hygiene, with a clear presentation of the consequences of abuse, must in some way be provided for the young before substantial progress can be hoped for. The large number of cases in which infection is known to have taken place before the age of twenty—or even, incredible as it may seem, before sixteen—makes the importance of early education apparent.

It seems clear also that the process of education must begin with the already "educated" classes. The general ignorance and indifference among those on whom rests the responsibility for preparing boys and girls for life, parents, teachers and religious instructors, is the initial obstacle to overcome. It is idle to argue as to which of these shall be required to supply the necessary instruction while none of them as a class are qualified to do so. Beyond a doubt the mother is the best of all instructors—the one who would be the choice of the boy or girl as well as of theorists. It is only when she fails to perform this duty that others must be called upon to do it.

In some way it must be made possible to give this necessary specific instruction without violating the instinctive sense of modesty which all would be sorry to see educated away—not tearing down with rude hands the veil before the mysteries of life, but rather, with dignity and reverence, revealing to every boy and girl his place in nature's scheme. Besides this, it may not be visionary to trust that much can be done by holding up before the young the beauty of the virtues of temperance and restraint, the dignity of the human body as the temple of the soul.

Gentlemen, I have been quoting—as perhaps you may have surmised—but from my own writing. The quotation is from an editorial written and published in February, 1906—twenty-five years ago. I do not quote it because of its profundity, or because it is at all an accurate analysis of your problem, or of the general problem of social hygiene at this time. There are some things in it, and even in the much more important articles by physicians on the same subject in the same number of "Charities and The Commons"—as *The Survey* was called in those days—which would now have to be modified. I quote it for another reason. I remembered it, and refreshed my memory about it at this time, because of my very vivid recollection of an incident which you may find of interest and which seemed to me relevant to this occasion.

Those harmless, innocuous, and shall I say rather obvious, observations, twenty-five years ago, caused great consternation in the Executive Committee of the Charity Organization Society, which was then publishing the journal in which they appeared. I was the editor of the journal and the executive officer of the society. I happened to be away, perhaps studying in Boston some of the progressive methods of my contemporaries in social work here. In my absence members of the Executive Committee gave vent to their personal sense of outrage and indignation. One of the most generous among them, from whom I had received first and most liberal assistance in starting an anti-tuberculosis committee, vowed that the journal would never again appear on her library table. Another had already stopped his own subscription. The committee by unanimous action adopted a resolution instructing the editor not to repeat the offense and to exclude from the columns of *Charities and The Commons* all discussion of the subject of venereal disease, or the proceedings of what has since become the American Society for Social Hygiene.

When I got back and learned of this resolution, I had what was literally the only sharp discussion of an irreconcilable difference of opinion with the president of my society, my dear old friend Robert W. de Forest, easily the foremost citizen of New York when death claimed him last week in his eighty-fourth year. I had to say to him on this issue—and I never had to say it to him or to my society on any other issue in a service of twenty years—"You cannot do that. You can, of course, change editors. You can find a new secretary; but while I am secretary and editor, you will have to let me decide what to publish." Mr. de Forest thought I was making a mountain out of a molehill. I think he pretty nearly lost his extraordinary patience. I remember he asked at one point, "Do you mean that you would really risk losing your opportunities in the C. O. S.—and perhaps also at Columbia", where I had recently become a professor, "over an issue of this kind?" Of course I told him that I meant just that.

I did not ask the committee to rescind or modify its resolution. I simply had a perfect understanding with Mr. de Forest that I would pay no attention whatever to it—that he would

explain to them, as he did, that the editor would have to have a free hand, and that so long as I had their confidence in general and remained on the job, the responsibility would remain with me to decide what to publish. That was satisfactory; but the end of it—what I really want to say about it—is more satisfactory still. A few years later—it may have been ten years—when Paul Kellogg had become editor of *The Survey,* and some question had arisen between him and Mr. de Forest, who was still president of his board, I had a conversation with Mr. de Forest about it, in the course of which he actually referred to the very considerable amount of space which we had long given to the subject of social hygiene and the prevention of venereal disease, without the slightest objection from any of our trustees, as a gratifying evidence of our liberality. He had wholly forgotten the incident which marked the inauguration of that policy.

The social hygiene movement—the broader organized campaign for the prevention of the venereal diseases and for the education of the public in sex hygiene—has everything to gain from the work of this specialized medical society. Dr. Stokes refers rather pathetically to the position of the practising physician in this country who would like to do better than the average for the venereal patient, as subordinated to the general educative program of the social hygienists, including this handicap with two others—the absence of a national association of his own, and the division of interest between the urological and the dermatological camps, and describing him as left to the ministrations of the state and public health services, whose officers, he says, have loyally stood up to the responsibility as best they could in the face of multiple obligations, cut budgets, and unsympathetic and obtuse legislative committees. If there has been such subordination to the general educative program of the social hygienists, you are now to end it and with their cordial consent, and that is one of the things which we could not have foreseen twenty-five years ago.

You have here in the Neisserian Medical Society what there was ten years ago in the Venereal Disease Control Institute in Washington; and this Society is better than that Institute of ten years ago, first because it is to be a permanent organization, and secondly because it is for gonorrhea only, thus ending, if Dr. Stokes will permit, another subordination—that of the urologist's specialty to the dermatologist's—more serious than that of the practising physician to the general educative program of the social hygienists. I may cite as evidence what Dr. Pelouze told your New England Health Institute, just about a year ago, that while untold amounts of money have been and are being expended upon research in syphilis, almost none has been spent upon research in gonorrhea; and this he thinks is not because the money cannot be obtained but because no one has tried to get it.

Gonorrhea, like tuberculosis, reveals, insists upon and proves the brotherhood of man. Its exciting cause goes directly from one person to another. No intermediate host interferes. The danger lies not in the air, the soil, or food, or drink; not in inherited taint or vengeful wrath of an offended deity or the mysterious incalculably woven web of fate. The danger lies in the person of another human being with whom the victim comes into intimate contact. If father and son, mother and child, brother and sister, fellow-employees across the desk or bench give and take tuberculous infection, emphasizing the doctrine of the new public health that the source of infection is not inert matter but another human being, even more does the passing of the gonococcus in the course of the sexual embrace underscore the truth of that idea. In the most intimate and ecstatic of all possible human relations, at the moment when normally a new life may be conceived, or, failing that, at least a man and a woman may enter into the most complete emotional union, one chosen, according to our Holy Scriptures, as the most perfect symbol of the union of Christ with His Church,—it is at such a moment that the Neisserian infection usually occurs. What better evidence could the most hellish imagination conceive of the consciousness of kind as the true basis of social human relations? Brothers you are, of one blood—New Englander and Southerner, White and Red and Brown and Black, Occidental and Oriental, Old and Young, Male and Female, for this plague touches and curses you all. There is no immunity where it exists and where sex relations occur, and without sex relations the race does not survive. Prostitution, irregular sex relations, no doubt facilitate infection, but the beginning of wisdom is the realization that the prevalence of gonorrhea and the need of combating it do not arise from prostitution and from extra-marital sex relations, but from the very existence of the disease and the certainty that some of those who have it will infect others who are neither prostitutes nor their patrons.

Our hope, our only hope, of controlling and diminishing and perhaps exterminating the disease is to proceed on the assumption that our interests are one, that all afflicted persons, whether married or unmarried, male or female, prostitute or respectable, innocent or guilty, first offender against conventional standards or habitual offender, are to be treated and cured,—instructed, warned, guided, controlled in addition if necessary—but first of all discovered, treated and cured—preferably self-discovered by their own voluntary approach to a clinic or a private doctor, but if not thus voluntarily

on a general invitation, then by a persistent, well-organized social control. As by Thompson's *Hound of Heaven,* with "unperturbed pace, deliberate speed, majestic instancy", every man and woman who is a source of danger must be hunted down; not in cruelty, but in social love, not for punishment, but for care, not for the protection of others merely, but for the protection of all of us.

From the social point of view, tuberculosis and gonorrhea have points of resemblance in contrast with syphilis and smallpox. I am indebted again to Dr. Stokes' Biggs Memorial Lecture of 1929 for calling attention to the contrast, although he makes it as between tuberculosis and syphilis and as the basis for a warning that the precedents of the Tuberculosis Association are not of such direct applicability to the problem of syphilis that they should be forced on the workers. The point is that with syphilis you have in the arsphenamines a chemotherapy which will within twenty-four hours reduce the condition to non-infectiousness in the overwhelming proportion of patients, and you can keep it there. This is what vaccination does for smallpox. But since this is not the case in either tuberculosis or gonorrhea, the precedents of the tuberculosis movement are perhaps more applicable—not of course in your research or clinical work, but in the broader social policies which you will recommend.

However, the main thing for both your members and for outsiders to realize is that what you are to do is not for laymen, not for amateurs, not for preachers or teachers or social workers, not for employers or labor leaders, not for editors or publicists or reporters, not for statesmen or agitators or reformers. It is specifically for the medical profession—for its research scientists and its practitioners.

Socialized medicine means to some people state medicine, supported by taxes and given freely to all—like elementary education and the use of highways. To others it means sickness insurance, universal and compulsory, administered by the state, but differing from state medicine in that it deals only with finances, with the cost of sickness, leaving the question of professional medical and surgical practice to be arranged by contract between doctors and the insurance funds. Personally, I am for sickness insurance on that basis, as a means of meeting the pecuniary costs of medical care, and if doctors oppose it, as of course they have the right to do, I think it is incumbent on them to devise some other means of insuring that all wage earners and their wives and children shall not be deprived of hospital, sanatorium, medical, surgical and convalescent care when they need it.

But socialized medicine does not necessarily mean either state medicine or state insurance. There may be combinations and compromises. The essential is, I think, some reconciliation of two perfectly good ideas. One is that of individual responsibility. America, we have said all these years, is another name for opportunity, and if that is so, we must hold each able-bodied, rational adult responsible for the use which he makes of his responsibility, responsible for its consequences to himself and his natural dependents.

In the educational propaganda which is to supplement the immediate work of The Neisserian Medical Society, there is a place for this doctrine. It is not a curse, but a promise. But this doctrine, although a truth, is not the whole truth. There is another supplementary and equally true doctrine. We are members one of another. We have a joint, an indivisible, a social responsibility. Our problem is to reconcile individual and social responsibility for they are not incompatible.

THE program of the meeting of the Neisserian Medical Society held at the Boston Dispensary, November 18, 1931, consisted of a symposium on gonorrheal vulvo-vaginitis. The following papers were read at the meeting.

In addition, Dr. Walter M. Brunet, medical director of the Chicago Public Health Institute, read a paper entitled "A Study of Several Hundred Cases" which is to be published by the United States Public Health Service in Venereal Disease Information.

GONORRHEAL VULVOVAGINITIS

A Statement of the Problem†

BY N. A. NELSON, M.D.*

SINCE gonorrheal vulvovaginitis in young girls is more a problem of morbidity during the duration of the infection than of mortality or even of subsequent complicating pathology, it deserves greatest consideration from the point of view of exclusion of the patient from school for long periods of time. The importance of gonorrheal vulvovaginitis as a medical and school problem may be estimated, then, from the answers to the following three questions:—

†From the Massachusetts Department of Public Health.
Read at the meeting of the Neisserian Medical Society of Massachusetts at Boston, November 18, 1931.

*Nelson—Assistant Director, Division of Communicable Diseases, Massachusetts Department of Public Health. For record and address of author see "This Week's Issue," page 151.

(1) Is gonorrheal vulvovaginitis prevalent?
(2) Should girls with this disease be excluded from school?
(3) How can the treatment of this condition be so improved as to shorten materially the present long duration of the infection?

I will attempt an answer to the first question, as well as to that part of the second question which concerns the attitude of the Department of Public Health through its Subdivision of Venereal Diseases.

PREVALENCE

It is quite generally accepted everywhere that gonorrhea is perhaps the most incompletely reported of all reportable communicable diseases. In the first place it is apparent on the basis of a number of studies and surveys made throughout the country that not more than half of the gonorrheal infections in existence ever come to medical attention. It is evident, furthermore, that of those cases which do come to medical attention, certainly not more than a quarter are reported to the health authorities. Thus the reported prevalence of gonorrhea may well be multiplied by eight if its actual prevalence is to be anywhere nearly approximated.

A further adjustment must be made so far as gonorrhea in the female is concerned because of the too frequent failure on the part of physicians to recognize the disease, a failure which is evident from the following Massachusetts figures:—From 1919 to 1925 of 32,502 cases of gonorrhea, the male-female ratio was 5.5 to 1; from 1925 to 1928 of 29,498 cases, the male-female ratio was 3.8 to 1; and in 1930 of 6,987 cases, the male-female ratio was 3.3 to 1.

During the same periods the male-female ratio in syphilis was as follows:—1919-1925 (13,490 cases) 1.9 to 1; 1925-1928 (11,201 cases) 1.4 to 1; 1930 (4,197 cases) 1.4 to 1.

Suspicion of gonorrhea in the male is almost invariably aroused by more or less simple clinical findings. Suspicion of gonorrhea in the female, in the absence of pointed history or of clinically acute infection, is rarely aroused owing to the too general acceptance of leucorrhea as an annoying but not usually significant condition. Syphilis, on the other hand, presents a very similar clinical picture in either sex and confirmation of its diagnosis depends upon relatively precise laboratory procedures which may be applied to the disease in either sex.

There is no etiologic or social reason for the reported disagreement between the male-female ratios for syphilis and gonorrhea. In fact those clinics where special attention is paid to the diagnosis of gonorrhea in the female, the male-female ratio is about 2 to 1 and much more closely approaches that for syphilis. To summarize the above, then, female gonorrhea is less frequently recognized and less frequently reported than male gonorrhea; not more than a quarter of all gonorrheal infections under medical care are reported and probably not more than a half of all gonorrheal infections come to medical attention. Thus the 13,000 cases of female gonorrhea reported in Massachusetts since 1919 represent only a small fraction of the total female infections.

Bearing this in mind, we may be better able to appreciate the significance of the following figures representing the reported prevalence of gonorrhea in girls under 14 years of age. From 1919-1925 (494 cases) this group constituted 9.9% of the total female gonorrhea; from 1925-1928 (684 cases) 11.0%; and in 1930 (204 cases) 11.8%. It is interesting to note the percentage increase of gonorrhea in this group in spite of the fact that there is a general improvement in the recognition of female gonorrhea, and in the last year or two a considerable increase in the total number of cases of gonorrhea in the female reported.

It is interesting also to note that the question of voluntary sex experience on the part of girls in the upper limits of this age group is responsible for the least part of these reported infections, for we find that 31.4% of the cases are in children under 5 years of age; 44.9% in girls from 5 to 9 years of age; and only 23.7% in girls from 10 to 14 years of age.

Thus more than 10% of reported gonorrhea in the female occurs in girls under 14 years of age and 76% of the gonorrheal infections as reported in this group is in girls under 10 years of age. Epidemiologically, then, it would appear that gonorrheal vulvovaginitis was sufficiently prevalent to make it a problem worthy of consideration.

EXCLUSION FROM SCHOOL

Sections 109, 111 and 112 of Chapter 111 of the General Laws provide for the reporting of diseases which have been declared by the State Department of Public Health to be dangerous to the public health. Section 112 goes on to say, however, that the provisions of these sections shall not apply to gonorrhea and syphilis, which diseases shall be reported "in accordance with such special rules and regulations as the Department may make having due regard for the best interest of the public". The Department of Public Health, having due regard for the best interest of the public, has required that the identity of the person suffering from gonorrhea or syphilis shall not be reported except for very definite reasons. Of these there are but two, the first being in the case of premature discontinuance of or refusal to submit to treatment, and the second being the employment in certain occupations of persons having open and

exposed lesions of early syphilis. There is no restriction placed upon gonorrhea other than in case of failure to submit to proper treatment. Thus the Department recognizes that while syphilis may be spread in other ways than through sexual intercourse, gonorrhea rarely is spread except through some form of close physical contact of a sexual nature.

Therefore, since local boards of health will, under the regulations, have no information as to the identity of school children with gonorrheal vulvovaginitis, they cannot report such cases to the local school committee as they are required to do for other communicable diseases under Section 113 of Chapter 111. Further, although gonorrhea is one of the oldest of communicable diseases so far as medical history is concerned, it is not mentioned in Section 56 of Chapter 71 which provides regarding school children that "A child showing symptoms of smallpox, scarlet fever, measles, chicken-pox, tuberculosis, diphtheria, influenza, tonsillitis, whooping cough, mumps, scabies or trachoma, shall be sent home immediately, or as soon as safe and proper conveyance can be found; and the board of health shall at once be notified." While it is true that local boards of health have made specific regulations for the exclusion from school of children suffering from other communicable diseases than these, I am certain that there will not be found in the regulations of any city or town in the State of Massachusetts any reference to gonorrhea. Even the examination of school children as carried out under Section 54 of Chapter 71 is in practice limited to that part of the body above the waist.

Apparently so far as laws and regulations are concerned, the only school child with gonorrhea in whom the condition may be discovered legally is the one who because of an unusually severe infection has had to remain away from school and who on applying to the board of health for a certificate for return to school might disclose the nature of the illness. Apparently, then, there has not been in the entire history of gonorrhea in school children a sufficient fear of its spread in the public schools to make it even worthy of mention. If gonorrhea were to be handled administratively by the school authorities in the same manner as other communicable diseases, it would be necessary, under Section 15 of Chapter 76, to exclude a child from a household where a person ill with gonorrhea was present, and the exclusion would have to continue so long as the child lived in the same house with the patient.

It would seem, therefore, that until the school authorities can show that the presence in school of a child suffering from gonorrhea has been or may be followed by an outbreak of the infection among other children in the school, there is no basis for excluding that child.

THE POINT OF VIEW OF THE CLINICIAN*

BY A. K. PAINE, M.D.†

THE opinions expressed are the result essentially of a clinical study of the cases coming to the Gynecological Clinic of the Boston Dispensary.

In the interest of brevity and to provoke instructive criticism our conclusions may be stated categorically somewhat as follows:

In only half the cases, with an inflammatory reaction in and about the introitus, will a laboratory diagnosis of gonorrhea be made. Clinically we are unable to tell in advance which case will have a positive smear. In half the vulvovaginitis cases some other organisms or factors are etiologically operative, with the gonococcus in no way implicated. In the other fifty per cent there we have a laboratory diagnosis of gonorrhea. We find that in approximately one-half of these the laboratory diagnosis is confirmed by a definite history indicating the probability of a true gonorrheal infection. This history includes that of various types of assault, and of the curious sex activities of childhood, the latter surprisingly frequent. In the other half of this group, also with a laboratory diagnosis of gonorrhea, we have been unable to obtain a satisfactory explanation of how the infection could have been acquired. There arises a question at this point as to the correctness of a common belief, that gonorrhea in female children is easily and frequently disseminated by means and methods not recognized as possible in the adult infection. It is my personal belief that "gonorrheal vulvovaginitis" (meaning gonorrhea in the female child) is acquired only by direct or sex contact, this designation to include infections acquired during birth and those intimate contacts which come from sleeping together even though sex, from a behavior standpoint, is not present. A young child sleeping with an infected mother for instance, is theoretically exposed to recent discharge, representing practically a direct contact. The epidemics of so-called gonorrheal vulvovaginitis which occur in children's wards, with the infants isolated in cribs, require an explanation not compatible with any knowledge we have of the gonococcus. McElroy[1] in the *Pennsylvania Medical Journal,* Dec. 1930 states: "One such epidemic occurred in a child-caring institution with which we are connected, about five years

*Read at the meeting of the Neisserian Medical Society of Massachusetts in Boston, November 18, 1931.

†Paine—Surgeon-in-Chief, Department, Diseases of Women, Boston Dispensary. For record and address of author see "This Week's Issue," page 151.

ago, and in spite of a rigidly enforced technique, within a short time twenty out of twenty-five girls became infected." In the absence of a reasonable explanation of how the infection in a given case could have occurred, one is justified in questioning a laboratory diagnosis of gonorrhea which is based on a smear examination alone. Obviously the doubt arising in such a case might be overcome by cultured methods. This theoretically is an easy solution of one of the problems presented by this subject but in practice seems not so simple. Technical difficulties in growing the gonococcus, plus the time and trouble involved, together with results not always conclusive have mitigated to make the procedure less commonly employed than its theoretical dependability would seem to warrant. Williams[2] in the *American Journal of Obstetrics and Gynecology,* 16; 861-866, Dec. 1928 says: "Our experience with diagnostic cultures agrees very closely with that of Stein, that they cannot be relied upon." To recapitulate: In one-half the vulvovaginitis cases laboratory evidence of the gonococcus is never obtained. In twenty-five per cent of the cases the laboratory diagnosis of gonorrhea is made, and corroborated by histories of sex, or direct contact. In the remaining twenty-five per cent of the cases we have a laboratory diagnosis of gonorrhea but not available a reasonable explanation of how the child could have acquired this disease. I am personally convinced that a certain proportion of these cases runs concurrent with upper respiratory tract infections, analogous to that epidemic vaginitis so commonly seen in adults. This latter also frequently discloses organisms mistaken for the gonococcus. This theory furnishes a reasonable explanation of epidemic vulvovaginitis in institutions; there is no question about its being highly infectious. In the early days of our work we made smears of the nasal secretions at the same time we took the vaginal smears in a number of cases of this type. A surprising uniformity in the smear pictures from the two sources was observed.

Concerning treatment and management of these cases. When this special work began in the Dispensary some fourteen years ago it was apparent there was no treatment in use then which could be depended upon to bring about a cure in anything resembling a reasonable length of time. We consequently refrained from carrying on these treatments. Within a comparatively short time it was apparent that the discontinuance of active treatment was accompanied by a definite improvement in some cases. For fourteen years the only treatment in these vulvovaginitis cases at the Dispensary, which includes the true gonorrheas, the border-line group, and those definitely not gonorrhea, has been soap and water cleanliness and the external use of boracic acid powder. The specific value of the latter is of course open to question but it is non-irritating and it is the peg on which the cleanliness procedure is hung. The frequent use of boracic acid powder, from the standpoint of the person caring for the child, is an essential, and the powder is not to be applied until the child is carefully washed. By indirection we accomplish what we feel is most important in the management of these cases, cleanliness. Lees[3] in the *Edinburgh Medical Journal* May 1928 says: "Dirt alone undoubtedly may play a part in the production of an inflammatory condition in and around these areas."

In the twenty-five per cent, gonorrhea without question, we find one of the problems encountered in the adult: this is not to find some new and remarkable drug, it is rather the problem of behavior, the elimination of reinfection. If the very young child continues to sleep with an infected older person, if the child is one of a coterie engaged in sex experimentation, or is frankly engaged in sex activity, all surprisingly frequent, the chances of cure by medical treatment alone are exceedingly remote. Our most difficult cases from the standpoint of cure have been the older children in this group and the difficulty is obviously the difficulty of behavior control. In the second twenty-five per cent of these cases there is the laboratory diagnosis of gonorrhea but there appears no behavior problem. We have generally observed less difficulty here in obtaining cures. In all the groups are encountered not infrequently cases with persistent clinical evidence of the inflammatory reaction obviously associated in some cases with the problem of the so-called neglected child. When difficulty is experienced of securing that degree of care and cleanliness important in all the cases, delay in the disappearance of the inflammatory reaction almost invariably occurs. A word about the active treatment of vulvovaginitis, meaning douches, irrigations, instrumentation and applications of various antiseptic preparations. It is our strong conviction that such active treatment in itself prolongs the inflammatory reaction. It undoubtedly alters the character of the vaginal secretions and brings about vaginal mucosa changes which closely resemble clinically, the so-called senile vulvovaginitis. This type of vaginitis is characterized by a great variety of organisms, classified and unclassified, some easily and frequently mistaken for the gonococcus. In the senile vaginitis of the aged we have not infrequently secured a laboratory diagnosis of gonorrhea which from the standpoint of securing freedom from so-called positive smears represents perhaps the most difficult case. I am convinced that an analogous situation is to be observed in the very young, resulting from the prolonged use of vaginal treatments. Certainly in our experience the cessation of such treatment in cases with symptoms

extending over a period of years, has been accompanied by gratifying results. The following tables illustrate some of the points emphasized. They represent fifty consecutive cases of "vulvovaginitis" taken from the records of the Dispensary, dated back sufficiently for each to provide for an end result.

These fifty cases made 1151 visits to the clinic, an average of twenty-one plus per patient; visits are made at approximately weekly intervals, and a smear is taken at each visit. Twenty-five cases had "positive" smears. Four cases had "suspicious" smears only. Twenty-one cases had negative smears only. Fourteen of the twenty-five cases with positive smears had a social history compatible with a true gonorrhea. One case had twelve positive smears. Two cases had eight positive smears. These three cases emphasized the importance of the behavior aspect from the standpoint of cure inasmuch as each was a member of the same vicious coterie in a local school.

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THE POINT OF VIEW OF THE INSTITUTION*

BY J. R. HAMILTON, M.D.†

IT was thought that it might be of interest in a meeting of this kind for me to give a short report of our experiences with the management of G. C. Vaginitis in an institution such as the Long Island Hospital, chiefly because we have such good control of our patients. In other words we have our patients with us all the time and very little arises to interfere with whatever line of management or course of treatment we may choose to use. As you know, or at least those of you know who are acquainted with the City Hospitals of Boston, the Long Island Hospital is run in connection with the City Almshouse. Most of our patients, therefore, belong to the destitute class and usually have been sent in by some social service agency, or are the infants born of destitute mothers who in turn have been sent to us by these agencies. Therefore, when I say that we have our patients under unusually good control it is meant that we have them in the hospital constantly under ample nursing supervision, that we do not have to depend upon more or less incompetent mothers or others for carrying out the treatments, nor are we hampered by any uncoöperativeness or antagonism on the part of the families.

I find in looking back through our records that we have a very accurate account of all that has been done in the way of treatments and so forth, with the results obtained, in the past year and a half. Since June of 1930 we have had forty-eight cases. The treatments as carried out have consisted of daily vaginal instillations of various forms of antiseptics calculated to be detrimental to the life and growth of the gonococcus.

Beginning with June 1930 the medications have been as follows:

1—Picric acid and bismuth subgallate for one month.
2—2% mercurochrome in lanolin and vaseline in half the cases and 1% silver nitrate in lanolin and vaseline in the other half, for seven months.
3—Metaphen in oil, four months.
4—Antiseptic douches (potassium permanganate or salamine X) followed by instillations of 2% mercurochrome over a period of four months.
5—At the present time we are using a system of alternating instillations of 2% mercurochrome on two successive days with a cleansing douche on the third day.

Treatments are done daily except on the last four to seven days of the month when they are omitted to allow the smears which are taken on the first of the month to show their true character.

Our infected cases are all housed in separate wards and clean wards are maintained for those who have never been infected or have been cured.

Since we have our patients under such good control you might expect us to be able to report better results than I can give you at present. Out of the forty-eight cases in the last year and a half there have been only fifteen cures. By a cure we mean consistent negative monthly smears over a period of six months, the patients in the meantime remaining under treatment. One infant was taken off treatment as cured and placed in a clean ward but the discharge and positive smears soon returned. However, most of the children are running negative smears at present, although not long enough to be classified as cured. Only three or four remain positive and these are also the only ones who show clinical evidence of the disease, namely irritation or discharge.

In regard to smears it has been my observation and feeling that they are not altogether reliable. At best they seem to me to be quite difficult to read and interpret correctly. For this reason the laboratory people are likely to err on

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the side of safety, and in doubtful instances are likely to report as positive, smears which are known to have been positive previously. No culture work has been done at our hospital.

In regard to the question of transmission of the disease I thought it would be interesting to see if I could find any evidence indicating the possible spread of the infection among the children in the hospital. Out of the total of forty-eight cases, twenty-one were positive on admission. Of these we have no way of finding out the source of the disease because most of them have had the diagnosis made previously and have been sent down for treatments from some other hospital or social service agency. One, or possibly two, had the history of sex contact. A few were found positive on routine admission smear. Twenty-three cases were either born in the hospital or admitted as infants with their mothers. Twenty-two of these mothers were known to be positive, a fact which seems to be quite significant. Four cases were in the hospital for periods ranging from nine to sixteen months before positive smears were recorded, but these seem to have been the initial smears, as no record of any previous negative smear could be found in any one of these cases. These findings would seem to indicate that there is practically no absolute evidence that there was any spread through casual contact in this series of cases.

THE POINT OF VIEW OF CHILDREN'S HOSPITAL AND PEDIATRICIAN*

BY HAROLD C. STUART, M.D.†

I HAVE been asked to take part in this meeting not because of any special knowledge regarding vulvovaginitis but because of ten years' experience at the Infants' and Children's Hospitals which should make it possible for me to express the hospital point of view regarding the problems which the disease offers. Even though for five of these years I was in charge of the Medical Out-Patient Department at the Children's Hospital, it is surprising how little contact with the disease my hospital experience has given me.

In looking over the literature of ten to twenty years ago dealing with gonorrheal vulvovaginitis in children, one recognizes a growing interest in and dread of this disease. It is hard to say whether there was really an increase in its incidence at that time, as was apparently believed, or whether it was simply being more generally recognized. In any event, it is apparent that an almost hysterical dread of the disease developed among those responsible for the institutional care of children. For example, Hess reported that 50% of the girl applicants to the New York Foundling Society had to be turned away because of the finding of this disease. Rachford (1916) stated before the American Pediatric Society that vaginitis was then recognized as one of the most prevalent infections in most of our large cities, especially in hospitals and other children's institutions; and that its intractability and defiance of ordinary quarantine regulations was recognized as presenting one of the most difficult problems occurring in any contagious disease. The following reference to the disease made in a report before the same Society shows the element of emotion which entered into deliberations on the subject at that time ". . . such a contagious, repulsive, degrading, and at times serious disease. . . ."

During the past ten years there has, undoubtedly, been a waning of pediatric interest in vulvovaginitis, and the question naturally arises as to whether this diminishing interest is due to a real modification in the incidence and nature of the disease or is an evidence of neglect. Stein apparently favors the latter view for in 1928 he wrote "genital inflammation in young girls is one of the most neglected and poorly managed conditions today".

In 1916 a Committee of the American Pediatric Society which had been studying the question of vulvovaginitis drew up a series of recommendations based upon an analysis of their findings. The questionnaires had drawn widely divergent expressions of opinion from such sources as health officers, medical societies, gynecologists and bacteriologists, social service, and visiting nursing organizations. One set of recommendations adopted by the Society was sent to health departments, and dealt in the main with provision of adequate facilities for the recognition and treatment of the disease, and for the control of its spread in schools, asylums, and other public institutions. We need not linger over this set of recommendations for I am sure we would all approve of their implications today; but it is of interest to note that even at that time a recommendation calling for the exclusion from school of positive cases was not accepted by the Society. But of more interest for our purposes were the recommendations sent to children's hospitals and other child-caring institutions. As these recommendations may be assumed to represent the best pediatric opinions on the subject in 1916, I will read them in a somewhat abbreviated form.

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†Stuart—For record and address of author see "This Week's Issue," page 151.

(a) That separate wards be maintained for the treatment of children with vaginitis who are also suffering from other diseases.
(b) That microscopic examination of smears be made before admission to the general wards of the hospital, etc.
(c) That observation wards be provided.
(d) That individual syringes, bedpans, catheters, clinical thermometers, thermometer's lubricant, wash basins, soap, powder, wash cloths and towels be provided.
(e) That single service diapers be used at least for girls, or that diapers be sterilized in an autoclave at 15 lbs. pressure for five minutes.
(f) That nurses be requested to make daily inspection of the vulva of each girl at the time of bathing, and to report immediately the presence of the slightest suggestion of a vaginal discharge.
(g) That low toilets be provided and equipped with seats embodying the U-shape.
(h) That for routine purposes the spray be used in place of tub baths in the bathing of young girls; and that older girls be sponged in bed.
(i) That nurses receive special instruction as to the nature of vaginitis, the ease with which it is transmitted, the methods of preventing its spread, and the necessity for rigid aseptic surgical technique in its handling and treatment.
(j) That a dispensary with adequate facilities for the treatment of gonococcus vaginitis be provided.
(k) That nursing care and supervision be given in the home.
(l) That mothers be instructed as to the dangers of vaginitis, etc.
(m) That all cases of vaginitis under observation be voluntarily reported to the local health officer in states and cities in which no legal requirements are in force.

It is doubtful whether the American Pediatric Society would accept today this entire list of recommendations, because pediatric experience in the past fifteen years has altered our ideas as to the difficulties involved in the control of this infection and as to the frequency of its occurrence among girls. Let me present a few figures based upon observations made at the Infants' and Children's Hospitals, Boston. The Infants' Hospital has admitted roughly 15,500 infants under two years of age since 1915. During that time the diagnosis of gonorrheal vulvovaginitis has been made twelve times and non-specific vaginitis five times. No case with a positive smear for gonorrhea has been encountered in the past twelve years. In spite of the fact that vaginal smears have not been required as admission routine for the past six or seven years, there has not only been no epidemic spread within the Hospital, but there has not been a single recorded case traceable to infection in the Hospital. It should be pointed out in this connection that infants coming for admission are carefully inspected and cases with discharge not admitted, except as emergencies; and that the recommendations of the American Pediatric Society requiring individual care have been scrupulously followed within the wards. A cubicle system and the system of strict individual precautions for each infant have more than carried out the spirit of those recommendations.

The Children's Hospital, of Boston, received within its wards or Out-Patient Department about 16,000 children annually in the five year period 1926-1930. The diagnosis of vulvovaginitis was made on the average of about 50 times a year, and a review of these 50 cases suggests that not more than 20 per year were positive gonorrheal infections. In a special gynecological clinic conducted at the Hospital to treat positive or suspicious cases, Dr. Hudson in 1927 found only nine positive out of 27 referred; and in 1929, 7 positive out of 41 referred. The smears taken in this special clinic were cervical in origin as a careful instrumental inspection for diagnostic purposes was routine. In reviewing the records of these hospital cases, one is impressed with the trivial evidence upon which the diagnosis of vulvovaginitis was commonly made, and one doubts whether very many cases were missed as is often suggested in the literature. The Pathological Department at the Children's Hospital has, during the past year and one-half, been taking routine sections of the cervix and vagina of girls coming to postmortem. Dr. Farber has kindly reviewed for me 50 cases thus examined, and reports that, while eight of these have shown some slight evidence of endocervicitis, not one of the 50 showed any gonococci or even suspicious organism in the section.

One can hardly entertain the idea that the disease is now widespread and chronic among our population, if it does not manifest itself more commonly under these circumstances. Even Stein, to whom I referred as considering this disease neglected, concluded his recent article with the statement that complications are rare, that the disease is self-limited at puberty, and that he had not encountered any known sequelae in later life. In the Birth Registration Area of the United States the diagnosis of gonococcus infection (all forms) was made 64 times in girls under 10 years of age in 1914, and 47 times in 1928. Correcting for the increase in the size of the area in this interval, there has been more than 50% reduction in the incidence of death during this time.

The pediatrician of today, on the basis of experiences similar to those presented, is con-

vinced that gonorrheal vaginitis is not, in its usual form and under reasonable conditions of hygiene, so acutely communicable as was previously thought, and that there has been a marked reduction in its incidence in recent years. He believes that this change is undoubtedly due in part to prevention, early recognition and better treatment in adults, and in part to improvement in cleanliness and hygiene in children. Whether a general improvement in the health of children living in the community is an indirect factor is debatable. These considerations suggest that many institutions are not justified in maintaining expensive services for the care of children suffering from this disease. The Children's Hospital in 1930 discontinued its Gynecological Clinic because of an inadequate demand for its service. The pediatrician also feels that hospital epidemics can be prevented if nursing and medical personnel are well-trained and follow careful individual precautions in dealing with each infant and child. Where such technique can be maintained an elaborate routine of admission smears and special temporary isolation does not seem to be called for and the vaginal smear itself is too unreliable to be of very great assistance.

The pediatrician believes that enough is now known about the sources of infection and the modes of transmission to make relatively adequate prevention possible and that we should look forward to a continuing reduction in the incidence of the disease. To accomplish this prevention physicians should be trained to seek a history of discharge or exposure, and to look for discharge or staining as a routine part of examination; and in the presence of positive evidence, differential diagnosis should be made between gonorrheal vaginitis and irritation due to foreign body, pinworms, other foci of infection, or simple uncleanliness. This differential should be made on the basis of a thorough vaginal inspection and cervical smear. The pediatrician has great faith in the success of simple treatment based upon cleanliness and the avoidance of excessive local medical applications and instrumentation.

Public health prevention may be furthered by health education as to the importance of prompt and thorough treatment of adult infection and strict personal hygiene in the presence of infection; and by improvement in general hygiene in childhood. To further prevention in child-caring institutions, nursing education should give emphasis to the methods of control of this disease.

THE POINT OF VIEW OF THE SCHOOL PHYSICIAN*

BY S. H. RUBIN, M.D.†

IT is the policy of the Boston School Department not to permit school physicians or school nurses to examine any girl attending the Boston Public Schools below the waist-line without the written consent of her parent or guardian or unless the examination is made in the presence of the girl's mother.

Because of this strictly adhered to policy, we are not aware of the existence of gonorrheal vulvovaginitis among the girl pupils attending our schools. Such cases are, however, frequently brought to our notice by the Health Department, by social service departments of hospitals, by private physicians, or by the child's parents, and such cases are immediately excluded from attendance at school until the child presents written evidence from an acceptable agency that she is free from the disease. This evidence consists of three negative vaginal smears obtained at intervals of two or three days. The child who presents such evidence is permitted to return to school.

Those who protest against the exclusion of pupils who are afflicted with gonorrheal vulvovaginitis must take into consideration the prevailing public sentiment in this matter, which would undoubtedly turn upon us the moment we waived our present policy of exclusion.

Our present requirements may impose a hardship upon those children but thus far we are not aware of any evidence which proves that gonorrheal vulvovaginitis is not contagious, does not spread in hospital wards, and in public and private schools, especially where a common lavatory is used by all children.

When such evidence is produced and the public will have been educated to the new thought, the school will reverse itself and permit children with this disease to attend school.

Since there is divided opinion in the profession with respect to the contagiousness of this disease once it has reached our hospital wards and our schoolhouses, the Boston School System must adhere to its policy of exclusion until it is reasonably certain that the health of our school children as a whole will be conserved by such exclusions even though hardship may be imposed upon a few.

*Read at the meeting of the Neisserian Medical Society of Massachusetts in Boston, November 18, 1931.

†Rubin—Assistant Professor of Pediatrics, Tufts College Medical School. For record and address of author see "This Week's Issue," page 151.

DISCUSSION

BENEDICT F. BOLAND, M.D., Boston: These several papers have portrayed a regular up-to-date textbook analysis of vulvovaginitis and have really thrown this subject out into the open with multiple ideas and theories some of which I agree with, while with others I entertain an opposite viewpoint. I, therefore, will discuss them in their order of presentation.

Relative to the 204 cases constituting 11% of the reported number of gonorrheal infections received by Dr. Nelson's department, I do not feel that the condition is so prevalent as years ago. We all know that many of these cases are not reported by the family physician and others, but even though they were recorded the numbers would not reach the amount they did years ago.

Dr. Paine's paper on the clinical aspect probably appeals to us all. However, on several points I am in disagreement. First of all his contention that one-half of his cases have a laboratory diagnosis of gonorrhea when other organisms may possibly be the factor, and that cultural methods are difficult, is not my experience. Two years ago at the Boston City Hospital when I conducted some experimental work on the cultural methods of this organism in conjunction with Dr. Mallory's laboratory, the ease with which this can be handled, once your technique is acquired, is surprising. We encountered some difficulty in separating the organism from other growths when transplants were made on agar slants. Using blood or ascitic agar as a media on Petri dishes and by dividing the dish in halves, so that one-half had the urethral and the other half the cervical smear, enabled the technician to transplant the pure culture very readily. I also cannot agree with Dr. Paine that active treatment prolongs the condition or that treatment with drugs produces a senile vaginitis. Our experience at two hospitals is the opposite.

Admission smears, separate wards, isolation program, such as Dr. Stuart outlined as in vogue 10 years ago, is not essential with the cubicle system with which pediatric wards are equipped. Today a child can be confined to a cubicle without the other children interfering and smears are only needed as a precautionary procedure in those new cases that appear suspicious.

Dr. Rubin is correct when he states that there are no cases in the Boston Schools. We treat all his school children at the City Hospital and dismiss them from classes until they have six negative smears and continue to follow them on Saturdays, so that they will not lose school, when the case permits their return. At the Massachusetts General Hospital this type of case comes from the suburban cities and among the state ward children. However, the help obtained by the school nurses in coöperation with our social services is a great factor in clearing up the clinical aspect.

Two years ago when I conducted some experiments at the Boston City Hospital on vulvovaginitis in children, I was interested to note that the cases for the previous two years which had had hygiene, argyrol and other medications ran about the same course. At that time we decided to shift our treatment to mercuride suppositories, manufactured by the Kenmore Pharmacy, Inc., of Boston, and potassium permanganate irrigations 1-5000 in strength. In the first two treatments the clinic nurse instructed the mother how to attach a small catheter to the douche bag and irrigate the external genitalia and then the vagina. Following this a mercuride suppository either 2 or 4% is inserted into the vagina. These suppositories are composed of a water soluble hydroglyceride base with 2 or 4% mercurochrome added. The hydro-glyceride base acts as a soothing agent and by virtue of the glycerine it contains, performs the function of a depleting agent. By dipping the suppositories in water they are softened so that they pass readily into the vagina without destruction of the hymen. The vagina is plugged with cotton to prevent the mercurochrome escaping. The mother is instructed to carry out this procedure every morning and night and it is surprising to note the remission of discharge and clinical evidence of infection. Negative smears appear in about 4 to 6 weeks. Occasionally we will encounter a case that is stubborn to any type of treatment but the general run of cases clear up under this method. In going over these records this morning I was surprised to note that of the 74 cases treated in the City Hospital during the past four years one-quarter showed assault to be the etiological factor. At the Massachusetts General Hospital of the 31 cases registered this year to date one-fourth were referred from the Ear and Eye Hospital where the child appeared for the first time for treatment of a conjunctivitis. Positive vaginal smears were obtained in these eight children. One death resulted in the City Hospital group, the child at operation showing a typical pus tube and pelvic peritonitis as is found in an adult female. In closing I again wish to thank the speakers for their very instructive and interesting papers.

N. A. NELSON, M.D., Boston: I would like to reply to some of Dr. Rubin's statements.

Dr. Rubin early in his paper stated that so far as the Boston School Department was concerned there is no gonorrheal vulvovaginitis in the Boston public schools. He pointed out that

there is no examination made by the school physicians which would disclose the existence of such infection and he complains that since evidence presented at this meeting points to its prevalence among girls of school age, the Department of Health, both of the State and of the City of Boston, have been delinquent in not informing the school committee of the identity of these cases. He insists that hereafter the school committee should be informed of the existence of gonorrheal infections in school children.

Dr. Rubin's admission that there is no gonorrheal vulvovaginitis in the public schools would seem to be sufficient evidence that its spread through the public schools cannot be a serious problem or it would have come to light as it has in years past in hospitals where outbreaks of the disease in children's wards were both frequent and extensive. It would seem, further, that if school children were to be excluded because of their infections with gonorrhea, exclusion might also be extended to school teachers and other school employees, which might, I fear, result in a considerable mortality so far as attention to school duties is concerned.

Dr. Rubin complains that if children with gonorrheal vulvovaginitis are to be permitted to go to school, parents would rise in angry protest and refuse to permit their children to attend such schools. It is not clear to me how, in view of definite legal requirements to the contrary, parents would ever learn of the existence of a case of gonorrheal infection in the public schools. Since it is apparent that a not inconsiderable number of girls are and have been attending school in spite of their infections, and there has been no audible expression of parental alarm, it would seem most unfair, without more evidence than is now available, to exclude children from school for months and sometimes for years because of an infection which no one has yet been able to show may be spread by attendance in the public schools.

REHABILITATION OF THE DISABLED, DEMANDS COÖPERATION OF VARIED AGENCIES

How 44 States and the District of Columbia coöperate with the Federal Government in the rehabilitation for suitable employment of those disabled through accident or disease, is told in a bulletin just released by the Federal Board for Vocational Education.

The necessity for organized relationship between the State and local rehabilitation forces and workmen's compensation bureaus, training agencies, social welfare agencies, hospitals and clinics, the public school system with its facilities for academic and vocational education, placement bureaus for the handicapped, employers, and labor groups, is emphasized in the bulletin.

Vocational rehabilitation, the Board's publication declares, is a social, educational, and economic service. Its success, therefore, depends upon the degree to which its activities are correlated and articulated with other social, educational, and economic agencies in State and community.

Rehabilitation services include locating cases of disablement; making a survey of the possibilities of rehabilitating them; providing physical restoration where this is necessary or possible, including the furnishing of artificial appliances such as arms, legs, or hands; vocational training; and supervision. With the multiplicity of services involved in rehabilitation in mind, it is not difficult to understand why rehabilitation agencies must correlate their services as far as possible with related agencies if they are to render effective help.

Emphasizing the advisability of local communities setting up their own facilities for the rehabilitation of their disabled citizens, the bulletin points out that the local community should shoulder the responsibility of rehabilitating citizens who incur disability while residing within the community limits. It is explained that the local agency is in better position to understand the needs and to take advantage of the rehabilitation facilities in its territory; that local administration is more economical than State administration, and that local authorities are in a more strategic position than State authorities to contact local industries for the purpose of placing citizens who have been fitted for employment in specific occupations.

Other subjects discussed in the bulletin, which is issued primarily for the benefit of those who are initiating or carrying on rehabilitation programs, include the functions and administration facilities of a State rehabilitation program, establishment of local programs, and case service in vocational rehabilitation work.

The new bulletin of the Federal Board may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C.

CASE RECORDS
of the
MASSACHUSETTS GENERAL HOSPITAL

ANTE-MORTEM AND POST-MORTEM RECORDS AS USED IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

EDITED BY RICHARD C. CABOT, M.D.
F. M. PAINTER, A.B., ASSISTANT EDITOR

CASE 18291

A CASE OF VOMITING, HEADACHE AND VERTIGO IN A CHILD

NEUROLOGICAL DEPARTMENT

AN American schoolboy thirteen years old was referred for study from another hospital, where he had already been studied for nine days. The complaints were vertigo, headache and vomiting.

The headache and vomiting were of a year's duration. The attacks had been increasing in frequency and severity. At first they occurred about three times a week increasing to four or five times and lasting from a few minutes to several hours. The pain was of a crushing type and was aggravated or brought on by vigorous exercise. Pressure over the forehead gave some relief. The vomiting was projectile, coming without any warning of nausea, and usually accompanied or followed headaches, though it often occurred at other times. Recently he had had it almost daily, usually after luncheon or supper. The vertigo had been present for about six weeks, having developed during the time the patient had been in bed. When he sat up or stood up he seemed to fall toward the left. X-ray examination of the skull in the hospital from which he was referred showed no evidence of a lesion in the bones. The groove for the blood vessel in the posterior part of the skull was enlarged, but there was no evidence of intracranial pressure. A blood Wassermann in that hospital was negative. The basal metabolism was minus 34. An oculist reported optic neuritis in both eyes and choked discs, more prominent on the right. During the past year the boy had lost much strength and about 40 pounds in weight.

The family history is unimportant.

He had always been in fairly good health until the present illness. He had had chicken-pox, mumps, measles and scarlet fever. He had had several minor injuries to his head, but never any severe enough to cause coma or to require stitches. His habits were good. His bowels moved about every other day.

Clinical examination showed a well-developed boy with marked signs of recent loss of weight. He was exhausted and somewhat dehydrated, and appeared to be seriously ill. The skin was dry and over the palms and forearms showed fine dry scaling. Full flexion of the chin on the chest was not possible because of pain radiating up the occiput. The rest of the general physical examination was not remarkable.

Neurologic examination was negative except that the patient swayed to the left with his eyes open or shut. There was marked generalized muscular wasting throughout, associated with loss of strength. There was some general loss of tonus. The posture was very poor; he had not sufficient strength to stand up straight. He held his head to the left and was not aware that he did this. He tended to fall toward the left. The finger to nose and heel to knee tests were fairly well done, but slightly jerky on the left. Rebound phenomenon was more marked on the left. The knee jerks and ankle jerks were decreased. Babinski, Oppenheim and Gordon were questionable on both sides. The other reflexes were normal. The extremities were dry and cold. The neck was slightly stiff and painful on flexion. There were bilateral choked discs, two to three diopters, more on the right, with congestion. There was nystagmus on looking in all directions, more marked to the left.

The amount of urine was normal when recorded. Two urine examinations were negative except for a few white cells and occasional red cells at one sediment examination. The white cell count was 8,000. Blood examination was otherwise normal. A Hinton test was negative.

Before operation the temperature was 98° to 100°, the pulse and respirations normal.

X-ray examination showed no evidence of disease of the chest. The skull was somewhat turret shaped. The anteroposterior diameter of the base was less than normal. The frontal bone was underdeveloped. The sutures were still visible. There was prominence of the convolutional markings in the frontal bone. The blood vessel markings were slightly increased in width.

The day following admission the boy said he had had the periods of dizziness and light-headedness for six months and that they tended to end in vomiting and were produced by sudden change in position, especially on standing up.

On the third day the nystagmus was more marked and there seemed to be the least suggestion of a left facial weakness. Both Gordon and Oppenheim tests showed dorsiflexion of the toes. The dehydration was becoming more marked, yet it was felt unsafe to force fluids subcutaneously or intravenously.

On the sixth day operation was done. For days after the operation the patient had hiccuping which did not respond to any treatment.

On the ninth day after operation a second operation was done. Four days later the temperature was 105.8°. A lumbar puncture showed an initial pressure of 220. 25 cubic centimeters of cloudy fluid was removed. It showed 954 cells, 66 per cent polynuclears, 33 per cent lymphocytes. The wound showed a small leak. The patient's hands were restrained. The following day he vomited with much force. At another lumbar puncture no fluid was obtained. A cistern puncture gave a slight flow of cloudy fluid. Aspiration yielded 27 cubic centimeters. A smear showed staphylococci in the clot. At the bacteriologic laboratory these were not found. The temperature steadily fell. The patient lost ground. That night he had a sudden attack of vomiting and died, two weeks and four days after admission.

Clinical Discussion

BY MAURICE FREMONT-SMITH, M.D., GEORGE W. HOLMES, M.D., AND RICHARD C. CABOT, M.D.

Dr. Fremont-Smith: That is a story of something seriously wrong in the head. One thinks of tumor and of abscess. There is one other thing that might give the same type of vomiting without nausea, coming on out of a clear sky, and that is syphilis of the central nervous system. Vomiting with or without nausea and pain is very apt to occur in central nervous system syphilis. Of course one would expect other signs, such as optical palsy, early. Except for the age of the patient it might be possible that we were dealing with syphilis. I have in fact seen one case of a girl of sixteen who came in with definite evidence of congenital syphilis and tabes. She had been vomiting for two weeks before admission. This group of symptoms, however, with emphasis on headache and vomiting, certainly causes us to feel that we are dealing with a growing lesion in the head. That is borne out by the fact that there is evidence of increased pressure in the eye grounds.

There is nothing in the past history to throw any light on the present situation.

We know there is a lesion in the head. In the light of the neurologic examination I think we can say that there is evidence pointing to the posterior fossa, that the cerebellum is apparently involved. We always have to remember that lesions in the anterior fossa (in the frontal lobe) may cause posterior fossa symptoms. The amount of choking of the discs, the cerebellar signs and the nystagmus all point here to the posterior fossa. The fact that he tends to fall toward the left and to turn his head toward the left, the rebound phenomena and the evidence of asynergia, more marked on the left, would make us feel that the lesion was in the left lobe of the cerebellum. The nystagmus points to some involvement of one of the cerebellar peduncles, I am not sure which one.

The white cell count of 8,000 is against brain abscess. Another argument against it is that we have no point of origin. We should like to know about the ears and sinuses. If the lesion were in the posterior fossa and if it were an abscess it almost certainly would have to begin in the ear.

Dr. Holmes: Examination of the chest and abdomen was essentially negative. I suppose the films were taken to rule out tuberculosis. There are no calcified glands in the peritoneal cavity and no evidence of miliary tuberculosis.

We have a series of films taken of the skull. The evidence again is largely negative. This I presume is the blood vessel mentioned in the description. It does look large. When we have large blood vessels like that it sometimes means that that particular blood vessel is supplying a tumor and the blood vessel is enlarged to take care of it. There is no calcification, no erosion of the skull and no increase in intracranial pressure, which would be shown by prominence of the convolutional markings. He has a rather large round skull, and the depth from the vertex to the base is greater than we usually see. The suture lines are visible. Those deformed skulls are usually produced by spreading or early closure of one of the sutures. He does not show evidence of such a condition.

Dr. Fremont-Smith: Does the fact that he showed by x-ray no evidence of increased intracranial pressure now mean that he had not had it long? We know that he has it now.

Dr. Holmes: It takes some time for prominence of the convolutional markings to appear. They are caused by the pulsation of the brain against the bone, eroding it. I do not know what the time necessary for that would be, but it would require some time. I may be at fault in my interpretation; but the variations from normal, especially in children, are considerable. This I think is within normal limits.

Dr. Cabot: Should you have thought it proper to put air in the ventricles in order to determine the location of the tumor any further?

Dr. Holmes: I think that would depend on how certain the neurological signs were. If they were going to do an operation on the brain and there was any doubt of the diagnosis I should prefer to have air injection before operation rather than have operation without their knowing where they were going in. I should not have it merely for diagnosis.

Dr. Cabot: This is a question merely of diagnosis. It is not a thing you would care to have done without good reason. You do not regard it as wholly without danger?

Dr. Holmes: It is somewhat uncomfortable. I think cistern puncture is much simpler than ventricular puncture, and can be done with

much less danger. We are doing that a great deal and we are not having any serious complications.

DR. CABOT: Can you get as good a picture?

DR. HOLMES: Yes, in most cases.

DR. FREMONT-SMITH: The suggestion of a left facial weakness helps to give us the side, because it would affect the left facial nerve as it came out. In other words if he had left facial weakness we would place the lesion on the left side if we already knew the lesion was in the posterior fossa. Of course left facial paralysis may come from a lesion on the right side in the case of a lesion high up on the right side, that is, on the cortex or in the internal capsule. It is only when we get below the area where the facial nerve comes off that we get paralysis on the side where the lesion is.

Was there dorsiflexion of the toes on both sides, Miss Painter?

MISS PAINTER: The record does not specify.

DR. FREMONT-SMITH: Of course it seems that the one thing that boy needed, even though they were afraid to give him fluids, was to reduce the intracranial pressure. One thing that might do that is salt. I suppose he has been losing chlorides all the time. It might have been possible to give him the chlorides he needed by hypertonic salt solution without raising the intracranial pressure.

For what do you think they operated? I should say from the facts we have here that they operated not for abscess, not for tuberculoma, for one reason because—I am not sure about this—I think tuberculoma in the posterior fossa is rare; I think it is more common up above. It is rather uncommon anyway. He certainly did not have tuberculous meningitis or he would have died in less than a year. The only things that bring up the question of tuberculous meningitis are those meningeal symptoms, the pain on flexing the neck on the chest, and certain tumors in the posterior fossa do give those symptoms.

I think we can be perfectly sure we are dealing with a tumor or an abscess. I think there is no good evidence for abscess. I think they are operating for a tumor in the left posterior fossa. I shall be interested to see where they made their incision.

PREOPERATIVE DIAGNOSIS

Left cerebellar tumor.

FIRST OPERATION

The usual type of crossbow incision was made and bone was removed from the occiput to the arch of the foramen magnum and atlas, exposing a fairly tense dura overlying the cerebellum. On incising the dura there was found to be a large cyst occupying chiefly the region of the left cerebellar fossa and the midline. This cyst was dissected away from the overlying dura and arachnoid for a considerable distance. The cyst was opened and about 100 cubic centimeters of dark orange colored fluid was removed. This cyst had exerted great pressure on the vermis, and the left cerebellar hemisphere had been compressed and thinned out so that it became concave and occupied a high position. The vermis was almost obliterated. A heroic attempt was made to dissect the cyst away, and this was done to a considerable extent. The dissection followed down into both angles and separate from the low cranial and upper spinal nerves. About two-thirds of the cyst wall was finally removed. It was impossible to remove it entirely. The cyst was found to spring not from the left side, but from the right cerebellar hemisphere, from what appeared to be a small glioma. Everything resembling tumor tissue was removed. It was about the size of a pea or a little larger. It was not certain that this represented all of the tumor, but the remaining tissues seemed more like normal cerebellum. The dura was left open and the wound was closed in layers.

POSTOPERATIVE DIAGNOSES

Left cerebellar cyst.

Glioma, right cerebellar hemisphere or vermis.

PATHOLOGIC REPORT

Astrocytoma, fibrillary type.

FURTHER DISCUSSION

DR. FREMONT-SMITH: The block was not due to the pathology in the aqueduct but to the tumor itself.

I do not know why the second operation was done.

MISS PAINTER: It was done for relief of the hiccups.

DR. FREMONT-SMITH: Possibly they thought some fluid got in there and was still causing pressure.

SECOND OPERATION

The left phrenic nerve was isolated on the surface of the scalenus muscle and crushed. Coincident with the crushing there was a marked decrease of the hiccups and inspection showed that he was hiccuping only with the right half of the diaphragm.

FURTHER DISCUSSION

DR. FREMONT-SMITH: Of course hiccupping in this case was a very unfortunate, very serious symptom.

The lumbar puncture findings following the second operation show that he had developed meningitis.

We assume he died of meningitis following operation.

A STUDENT: How do you explain the metabolic rate of minus 34?

DR. FREMONT-SMITH: I do not know how to explain it. I think any very sick child could have a low metabolism from dehydration or long continued atonia of the muscles. If he really were atonic he would be metabolizing less.

CLINICAL DIAGNOSES (FROM HOSPITAL RECORD)

Cerebellar tumor.
Cerebrospinal meningitis.

DR. MAURICE FREMONT-SMITH'S DIAGNOSIS

Cerebellar tumor, left.

ANATOMIC DIAGNOSES

1. *Primary diseases.*

Astrocytoma, fibrillary type, of cerebellum.

Meningitis (?), staphylococcus aureus.

2. *Secondary or terminal lesions.*

Ependymitis.
Operative wound, craniotomy.

PATHOLOGIC DISCUSSION

DR. MALLORY: Autopsy adds but little information on this case. The cerebellar cyst had been largely removed, but a circumscribed tumor 1.2 by 1.7 centimeters in size was found just adjacent to the operative wound. Probably this and the cyst both were parts of the tumor, since the majority of brain cysts are neoplastic in origin. Microscopic examination of the solid portion showed a tumor composed of well formed astrocytes, in other words a very well differentiated, slowly growing glioma.

The immediate cause of death is somewhat uncertain. There was herniation of the cerebellum through the foramen magnum. Grossly we could make out no evidence of meningitis, but microscopically there is a slight mononuclear and lymphocytic infiltration of the meninges and also of the subependymal tissues. Cultures of the spinal fluid during life were negative, while those we made at the autopsy table showed a staphylococcus aureus. I am rather inclined to think the staphylococcus a contamination however, since the type of cellular infiltration in the meninges is not that which one would expect with a pyogenic organism.

DR. HOLMES: Was there any evidence of ventricular dilatation?

DR. MALLORY: Very little. The ventricles were not dilated, or the aqueduct.

DR. CABOT: What is the exact connection between the cysts and the tumor?

DR. MALLORY: I think they were both gliomata. Dr. Kubik called this an astrocytoma, which is the most highly differentiated slowly growing type of glioma. Not infrequently it is cystic. The one other probable cystic tumor in the cerebrum would be the angiomatous cyst sometimes known as Lindau's disease and often associated with angiomas of the retina.

DR. FREMONT-SMITH: What do they look like in the retina? How big are they?

DR. MALLORY: They are very tiny red granules.

CASE 18292

RECURRENT PULMONARY INFECTIONS WITH WHEEZING RESPIRATION IN A CHILD OF FIFTEEN MONTHS

CHILDREN'S MEDICAL DEPARTMENT

PRESENTATION OF CASE

DR. WILLIAM M. GAMMON*: A fifteen months old white girl was admitted to the hospital coughing, sneezing and cyanotic.

The family history is essentially negative. The first child died at birth, it being a case of breech presentation.

The patient was a healthy full term Caesarian baby weighing 8 pounds and 3 ounces. At one year she weighed 21 pounds. The feeding and development were not remarkable. She was breast fed for two months, then put on a formula. She had eczema on the face from the age of two months to five months. At five months she had whooping cough. She had wheezed ever since that time, more with colds, which she had frequently. At nine months she had a mild attack of measles lasting only a few days.

The mother dated the present illness back to five weeks before admission, at which time the baby began to have attacks of coughing which came on at any time. There never was whooping. Five days before admission the coughing became worse and there was some choking and cyanosis. The temperature varied from 100° in the morning to 105° in the evening. A physician was called and ordered syrup of ipecac to break the spasm. Twelve hours before admission the patient had a very severe attack.

She was received in the Emergency Ward at half past five p. m., a weak, washed-out looking and cyanotic baby, breathing very rapidly, with a slight rattle in her throat. Both lungs were filled with many medium and large râles. The temperature was 102.4°.

She was rushed to the ward. On the way she almost stopped breathing, but recovered following artificial respiration and the giving of oxygen. She was placed in an oxygen tent. The temperature gradually rose to 105°. The respirations became more labored. No abnormal signs other than those in the lungs were recorded. Because of the child's extreme condition no laboratory work was attempted. She be-

*Interne on the Children's Medical service.

came gradually weaker and eight hours after admission died.

Clinical Discussion

Dr. Harold L. Higgins: I did not see this child. Judging from the history one would feel that the most probable explanation of the condition was that the child had whooping cough and as a result of whooping cough developed some bronchiectasis and with every succeeding cold had considerable bronchitis and difficulty in breathing. At the time she came into the hospital grippe was epidemic. Our feeling was that she had developed a respiratory infection which had caused a flare-up of the chronic lung condition with resulting bronchopneumonia and death.

clinical diagnosis (from hospital record)

Pneumonia, bronchial.

anatomic diagnoses

Cyst of the right lung with rupture into the pleural cavity.
Atelectasis, bilateral.
Pneumothorax.
Collapse of the right lung.
Bronchopneumonia, bilateral, slight.
Chronic bronchitis, slight.
Bronchiectasis, slight.

Pathologic Discussion

Dr. Tracy B. Mallory: The autopsy finding here I think was a complete surprise to everyone and a condition I think none of us has ever seen before.

On opening the thoracic cavity the right lung was found to be totally collapsed. The pleural cavity was empty. We felt that there unquestionably must have been a pneumothorax present, though since we had not suspected it before autopsy we did not open it under a water seal. Dr. Castleman inserted a pipette into the bronchus and when he blew in air we could make out some little bubbles coming from the surface of the lung. When we cut into the lung at that point we found this large cavity with an irregular trabeculated wall which you can see in the middle of the specimen. It measures 6 by 4 by 2 centimeters, which for the lung of a child of this size represents over half of one lung. In gross we could not trace any visible or probable opening into a bronchus, though air could be blown through. The cavity was completely empty; it did not contain any fluid.

My interpretation of the findings is that the child had this cyst of the lung, that the cyst ruptured into the pleural cavity, producing a spontaneous pneumothorax, and probably that the accession of respiratory difficulty was the immediate mechanism of death.

We have made a large number of microscopic sections of the cyst wall and the surrounding structures and we are unable to demonstrate any epithelial lining. Cysts of this type have been described in considerable numbers. The majority of them, perhaps two-thirds, seem to have had a definite bronchial type of lining; in other words they would suggest bronchiectatic cavities. In the remaining cases no epithelial lining has been demonstrable. The explanation there may possibly be that one is dealing with an enormous emphysematous bleb resulting from the dilatation and fusion of an immense number of alveoli.

Dr. Higgins: Was there bronchopneumonia too?

Dr. Mallory: There was a little bronchopneumonia, a little chronic bronchitis and slight bronchiectasis in the surrounding lung tissue.

Dr. Edward D. Churchill: Do you think the absence of lining membrane here suggests that there is no such thing as alveolar epithelium in the normal lung?

Dr. Mallory: No, I think not.

Dr. Aubrey O. Hampton: Do you think the thing could have been a congenital cyst?

Dr. Mallory: I cannot rule out the possibility. On the other hand if it were a congenital cyst one would expect it to be filled with fluid and not with air, and I think we must assume it was filled with air to account for the pneumothorax and the collapse of that lung.

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THE REGENERATION OF PERIPHERAL NERVES AFTER SUTURE

ALTHOUGH one finds much in the medical literature about lesions of peripheral nerves as the result of injury, there is a paucity of records regarding the actual effects of suture and the regeneration of divided nerves. The World War wounds provided abundant material for neurosurgeons to try out various methods of suture and, except for the complication of sepsis which occurred so frequently, most of the operations offered opportunities for careful approximation of the nerves and study of their regeneration afterwards. In this country, unfortunately, patients with peripheral nerve injuries were scattered throughout the various states and no careful survey of the whole group was possible. In Great Britain the conditions have been somewhat different, for the cases have been segregated in a few centers, particularly in the London area.

Recently over three hundred and fifty of these patients have been carefully studied, many of them ten years or more after operation.* A summary of the work is of considerable interest for it throws new light on the regeneration of nerves and indicates that there is still much to learn in regard to the process of repair. Dr. Burrow found that the earliest sign of regeneration appeared in the nerve trunk below the level of the suture and was elicited by gently tapping on the nerve. This stimulus gave a tingling, diffuse, uncomfortable sensation and as regeneration proceeded, the sign was obtained at progressively lower levels. This phenomenon, known as Tinel's sign, was first described in 1916. The sign is of considerable value but cannot be entirely relied upon.

In addition to Tinel's sign, a marked improvement in the trophic appearance of the skin and circulation of the affected part occurred early in the course of regeneration. Deep sensation returned next, the patients describing these feelings as like "a deep bruise" when firm pressure was made over the soft parts. Radiating, tingling, uncomfortable feelings elicited when the skin and deeper tissues were pressed upon, pricked or scraped appeared subsequently, to be followed by the finer feelings, such as those experienced by touching the hairs, and sensations of cold and pain. Discrimination of posture in the joints and muscles and light touch were the last sensations to return. It is interesting to note that in no case was complete recovery obtained so that the perception of sensation in the affected limb was exactly as good as that in the normal limb.

On the motor side, the proximal muscles almost invariably recovered before those distally placed. Electrical changes were variable. The more easily excited nervous tissue, as it was restored, anticipated the less excitable muscle, so that the character of the responses was altered because of this recovery. All of these patients had received long courses of electrical treatment, massage and muscle reëducation.

In general, it is to be pointed out that nerves will regenerate, particularly on their sensory side, provided careful suture is made in a clean field. On the motor side, much depends upon keeping the muscle involved in its normal physiological state while regeneration is taking place. This is only possible by a long course of galvanism and massage. Almost invariably the bad results of peripheral nerve surgery are not due to want of technique by the surgeon, but they occur because of lack of prolonged after-care. The best results in the war cases were seen in those patients who persistently carried out their instructions and received massage and electrical treatment over a period of many months and, in some cases, a number of years. This is a factor often lost sight of in civil life and seems particularly to be underestimated by industrial accident surgeons and insurance companies. The average pa-

*Burrow, J. Le Fleming. The phenomena of regeneration in peripheral nerves after suture. Proc. Royal Soc. Med. 25:1103, May, 1932.

tient with a peripheral nerve injury, where resuture is necessary, needs constant care for a period of one to three years, if the best result is to be obtained.

TEACHING OF MENTAL HYGIENE

THERE seems to be a very general opinion that progress in mental hygiene will depend to some extent on the instruction which is furnished to children in schools. Dr. B. C. Willis of Canada deplores the fact that so few educators in that country are doing experimental work with reference to mental hygiene in schools and that there has been practically no attempt at using the very valuable results obtained by psychological and educational research workers in Canada and the United States.

Contrary to the generally accepted idea, mental hygiene seems to be an educational matter. Much of the work in connection with it must be done in and through the schools, because its aims and methods are so intimately interwoven with education that it is impossible to separate the two. As to methods to be employed, it seems to be apparent that there should be developed experts in educational procedure who will be in charge of public schools and in that way an understanding of their responsibility with reference to this problem will be effectively instituted among the teachers. It is believed that a very definite percentage of pupils in schools are in need of special treatment with reference to the promotion of normal mental habits. It must be generally recognized that even the teachers, although graduates of State Normal Schools, have very little conception of the intricate problems of mental hygiene, and that attention to the details of training in this branch of education can come about only through a more general understanding of the necessity for such courses. This is especially important by reason of the economic loss which is directly attributable to mental disease.

According to estimates derived from a study by Dr. Pollock, statistician of the New York State Department of Mental Hygiene, and made public by the National Committee, the economic loss represented by first admissions to the state mental hospitals of the United States in the year ended June 30, 1931 was $742,145,956. Although this tremendous loss has been brought to the attention of the National Association, little interest has apparently been aroused among educators and sociologists. It has been found that about one-half of the patients who enter mental hospitals finally die therein, and that the average period of hospital life of such patients is between six and seven years.

The expense of maintaining patients in the hospitals for the insane must also be considered. Mortality statistics relating to mental patients show that they amount to 25% in the age period from four to six; 50% in the period from thirteen to seventeen and 75% in the period from twenty-eight to twenty-nine years, whereas in the general population the corresponding periods would be about thirty-two, forty-eight and fifty-six years respectively. This heavy mortality results in a reduction of approximately eighteen years and fourteen years in the life span of the male and female patients respectively. These figures indicate that, if there is any considerable proportion of children in public schools who might be cared for in a way to promote mental hygiene and diminish the number of candidates for treatment in hospitals for the insane, there would be a great saving to the community and a promotion of effective and productive members of the human family.

THIS WEEK'S ISSUE

CONTAINS articles by the following named authors:

CLIFFORD, STEWART H. M.D. Harvard University Medical School 1925. Assistant in Pediatrics and Child Hygiene, Harvard Medical School and School of Public Health. Assistant Visiting Pediatrist to the Boston Lying-in Hospital. Junior Assistant Physician to the Children's and Infants' Hospitals. Assistant Pediatric Consultant, Henry Heywood Memorial Hospital. Address: 270 Commonwealth Avenue, Boston. Associated with him is

HERTIG, ARTHUR T. B.S., M.D. Harvard University Medical School 1930. House Officer of Pathology, Peter Bent Brigham Hospital. Resident Pathologist, Boston Lying-in Hospital. Instructor, Department of Pathology, Harvard Medical School. Address: Boston Lying-in Hospital. Their subject is "Erythroblastosis of the New-Born." Page 105.

MORSE, JOHN LOVETT. A.M., M.D. Harvard University Medical School 1891. F.A.A.P. Professor of Pediatrics Emeritus, Harvard Medical School. Consulting Physician at Children's Hospital, Infants' Hospital and Beth Israel Hospital. Member New England Pediatric Society, American Pediatric Society, Association of American Physicians and Boston Obstetrical Society. His subject is "The American Academy of Pediatrics, Its Purposes and Scope." Page 113. Address: 319 Longwood Avenue, Boston.

STUART, HAROLD C. Litt.B., M.D. College of Physicians and Surgeons, Columbia University 1918. Assistant Professor of Pediatrics and Child Hygiene, Harvard Medical School and School of Public Health. Associate Physician, Children's Hospital. Visiting Physician, Infants' Hospital. His subject is "American

Academy of Pediatrics, Program for State Committee." Page 114. And "The Point of View of Children's Hospital and Pediatrician." Page 140. Address: 55 Van Dyke Street, Boston.

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DEVINE, EDWARD T. A.B., Ph.D. Secretary of the New York Charity Society 1896-1917. Professor of Social Economy in Columbia University 1905-1919. President of the Section on Hygienic and Industrial Aspects of Tuberculosis in the National Conference held in Washington in 1908. Director of the Bellevue-Yorkville Health Centre conducted by the Milbank Memorial Fund 1929-1930. President of the United Neighborhood Houses of New York. Executive Director, Emergency Work Bureau, County of Nassau, Mineola, N. Y. His subject is "Address before the Neisserian Medical Society of Massachusetts." Page 132. Address: 610 W. 110th Street, New York City.

NELSON, N. A. B.S., M.D. Long Island College Hospital, Brooklyn, New York 1926. Assistant Director, Division of Communicable Diseases, Massachusetts Department of Public Health. Assistant Physician, Department of Dermatology and Syphilology and Junior Assistant Surgeon, Department of Gynecology, Boston Dispensary. Acting Assistant Surgeon, United States Public Health Service. Assistant in Dermatology, Tufts College Medical School. His subject is "Gonorrheal Vulvovaginitis. A Statement of the Problem." Page 135. Address: 546 State House, Boston.

PAINE, A. K. M.D. Tufts College Medical School 1902. F.A.C.S. Surgeon-in-Chief, Department, Diseases of Women, Boston Dispensary. Obstetrician-in-Chief, Evangeline Booth Hospital. Consulting Obstetrician, Beth Israel Hospital. Professor of Obstetrics, Tufts College Medical School. His subject is "The Point of View of the Clinician." Page 137. Address: 80 Bay State Road, Boston.

HAMILTON, J. R. A.B., M.D. Johns Hopkins Medical School 1927. Assistant Resident Physician, Long Island Hospital. His subject is "The Point of View of the Institution." Page 139. Address: Long Island Hospital, Boston.

RUBIN, SOLOMON H. M.D. Tufts College Medical School 1908. Assistant Professor of Pediatrics, Tufts College Medical School. Instructor of Pediatrics, Courses for Graduates, Harvard University. Associate Physician, Children's Medical Service, Massachusetts General Hospital. Visiting Pediatrician, Beth Israel Hospital. Formerly Acting Director, School Hygiene, Boston Public Schools. His subject is "The Point of View of the School Physician." Page 142. Address: 45 Bay State Road, Boston.

NOTICES

REMOVALS

Dr. Sidney M. Bunker announces his removal from McLean Hospital, Waverley, Mass., to Westwood Lodge, Westwood, Mass.

Dr. Edward L. Twombly announces the removal of his office to 483 Beacon Street, corner Massachusetts Avenue, Boston.

Dr. Saul M. Marcus announces the removal of his office from 132 E. 19th Street, New York City, to the Bayonne Hospital and Dispensary, Bayonne, New Jersey. Dr. Marcus has been appointed Resident Urologist to the Bayonne Hospital. He has also become an associate of Dr. Stanley R. Woodruff, Associate Professor of Urology at the New York Post-Graduate Hospital.

SOCIETY MEETINGS
CONGRESSES AND CONFERENCES

July 10 - August 12—The Second Intensive European Summer Course in Surgery, Gynecology and Obstetrics. See page 714, issue of March 31.

September 19-22 — International Congress of Biliary Lithiasis. See notice on page 427, issue of February 25.

October 17-21—Clinical Congress of the American College of Surgeons. See page 1330, issue of June 23.

October 17-28—The 1932 Graduate Fortnight of the New York Academy of Medicine. See page 1375, issue of June 30.

October 22-24—Health Education Institute. See notice on page 47, issue of July 7.

October 24-27 — American Public Health Association. See notice on page 1321, issue of December 31, 1931.

October 24-28—Inter-state Postgraduate Medical Association of North America. See page 39, issue of January 7.